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ABSTRACT

The geo-demographic, economic, and infrastructural makeup of 12 African countries (Botswana. Gambia, Kenya, Lesotho, Malawi, Nigeria, Sierra Leone, Swaziland, Tanzania, Uganda, Zambia, and Zimbabwe) were compared to determine the potential benefits to them of a Commonwealth of Learning (COL) distance education initiative. Data were collected on six criteria regarding suitability for such initiatives: developmental need, geographic and demographic features, government priorities, infrastructure, existing experience, and human resource development. Data were incorporated into a multiattribute model that ranked countries by relevant indicators. Seven countries with a television/radio network and/or rural telecommunications infrastructure appropriate for cost-effective implementation of distance education were strong possibilities for COL: Nigeria, Kenya, Swaziland, Botswana, Zimbabwe, Zambia, and Malawi, but not Gambia, Lesotho, Sierra Leone, Tanzania, and Uganda. Countries offering the best opportunities for human resource development projects in the broadcasting sector were Gambia, Swaziland, Tanzania, and Zambia. The African regional networks were not conducive to use of distance education techniques between countries. (Appendixes, which represent the bulk of the report, include country summaries, multi-attribute comparison model, annotated list of existing correspondence and distance education programs, summary of country comparative analysis, outline maps of national and international earth stations, statistical data, and list of telecommunications and broadcast administrations with addresses.) (YLB)

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OPPORTUNITIES FOR DISTANCE EDUCATION IN THE COMMONWEALTH AFRICAN COUNTRIES

for

THE COMMONWEALTH Of LEARNING

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1.0 INTRODUCTION

The Commonwealth of Learning (COL) is looking for ideas on how to fulfil its mandate to promote distance education throughout the Commonwealth. As such, COL accepted a proposal submitted by Intelecon Research & Consultancy Ltd. which offered professional consultancy services concerning twelve Commonwealth countries in the Southern, East and West African regions. The objective of the work is to provide a descriptive and strategic overview of these twelve Commonwealth African countries, and to advise on the potential benefits to these countries of a COL distance education initiative.

There were two objectives to be met by the output of the study. The first of these was to provide conclusions on which of the countries have a TV/radio network and/or rural telecommunications infrastructure which is generally appropriate for cost-effective implementation of distance education.

Quite separate from this, but related to COL's overall goals, it was proposed that the study output attempt to describe which countries would benefit most from distance education targeted specifically to training and human resource development in the communications (ie. broadcast and telecommunications) sector.

The work undertaken covers the following twelve Commonwealth countries: Botswana, Gambia, Kenya, Lesotho, Malawi, Nigeria, Sierra Leone, Swaziland, Tanzania, Uganda, Zambia, and Zimbabwe. Country profiles developed for each of these countries outline:

- basic demographic, socio-economic and other indicators pertinent to inter-country comparisons
- general level of educational development (eg. literacy and enrolment statistics) and government educational priorities
- status of telecommunications network development, including extent and quality of services (particularly in rural areas), and telecommunications development plans and priorities
- as for the telecommunications network, the status of the broadcast networks in each country
- the organisational structure, manpower and training situation (the training institutions, their staffing, technical capabilities and output) of the telecommunications and broadcast administrations, and
- principal educational institutions and (in some cases) their experience or demonstrated interest in linkages or distance education concepts.

The country profiles are provided in Appendix A. They are organised both descriptively and in tabular format. These formats facilitated our analyses which include both singular country analyses and country-by-country comparisons. The objective of our summary and analyses are to provide COL with an information package for each country, plus an inter-country prioritization identifying key strategic options or opportunities for COL.

The study is primarily desk based and draws upon experience gained and information available to Intelecon from its extensive work in Southern and West Africa under the auspices of CIDA, the African Development Bank and various private sector agencies. The analysis and conclusions drawn are based mostly on a structural comparison of information and statistics. Although this includes a fair amount of local knowledge and qualitative assessment by the consultant, no specific investigations have been made in the field on behalf of COL as to the potential for locally based COL initiatives.

2.0 OVERVIEW AND METHODOLOGY

2.1 General Background and COL Mandate

The COL's objectives are understood to be encapsulated in the following fundamental mission statement:

> ... to promote the development of human resources through the application of distance education techniques and technologies in response to the developmental needs of member countries.

In accomplishing this mandate, the COL seeks to help create or broaden peoples' access to learning opportunities by cooperating and collaborating with universities, colleges, and other institutions in Commonwealth countries. It pursues the following goals:

- to extend and enrich existing educational programmes by fostering the sharing of distance education expertise
- to strengthen institutional capacities through the provision of training, communications technology, information exchange and collaboration in evaluation and research
- to augment institutions which already specialise in distance education methods by helping them to improve their services and study support systems

The study has been designed to assist COL in fleshing out this mandate. It compares the geo-demographic, economic and infrastructural make-up of the subject countries, with a view to drawing some conclusions

regarding their fundamental suitability as beneficial and cost effective environments for distance education initiatives.

This is a "macro" study which provides broad observations about the countries vis-à-vis distance education concerns. However, because of the nature and depth of the consultant's knowledge about the countries, some of the conclusions will hopefully lead to the identification of specific project opportunities.

2.2 Methodology

The following criteria together provide some indication of countries' relative suitability for distance education initiatives, and for COL in particular:

1) Developmental Need

Where is developmental need the greatest, in terms of such indicators as per capita income, literacy and school enrolment?

2) Geographic and Demographic Features

Which countries have geographic or demographic obstacles, in terms of size, physical features or population distribution, which stand in the way of access to conventional educational services?

3) Government Priorities

Where do the Government's spending or investment priorities indicate a high level of official commitment to education and to the country's communications infrastructures?

4) Infrastructure

Which countries have existing telecommunications and broadcasting infrastructures of sufficient extent and quality which can be readily utilized to good effect in COL sponsored or collaborative distance education ventures?

5) Existing Experience

Which countries have already demonstrated an interest in the aims of COL, in the form of extension or educational outreach programs, inter-country linkages, or distance education projects?

6) Human Resource Development

Which are the prime cases where the indicators for distance education are positive, except that training or human resource development within the telecommunications or broadcasting sector is particularly weak or represents a constraint on further development?

Whereas COL would not seriously base its strategy on any one of these criteria alone, taken together they form a framework upon which COL strategies for the region can be built.

The basic methodology of the study has been to collect and tabulate a broad range of data for the twelve countries. Those data which are complete and are considered suitable and reliable for inter-country comparison have then been incorporated into a Lotus 1-2-3 based multi-attribute model, in which countries are ranked according to a number of relevant indicators (eg, per capita income, adult literacy, % of government budget spent on education, telephone lines per 100 population, broadcast network area coverage, etc.).

The individual indicators are then grouped according to five of the six primary suitability criteria listed above. In this form, the countries can be compared on the basis of each strategic area separately. (The sixth criterion - Human Resource Development - is a qualitative assessment and therefore less amenable to modelling). This process allows separate investigation of different policy assumptions within each group (eg, is physical size, population density or urbanisation the most important geo-demographic feature determining general suitability for distance education?).

The overall conclusions allow a summary of country rankings to be made:

- by each of the five criteria separately, and
- as an overall composite

Some countries rank highly in just one or two criteria, whereas a few rank highly in four or five areas. These results hold strong strategic implications for COL.

2.3 Human Resource Development

This issue is complementary to the modelling activity and, as already noted, qualitative in nature. Since almost all of the countries studied have training institutions attached to their respective telecommunications and broadcasting administrations, the consultant's assessment of the state of training or human resource development is largely based on a judgement regarding the quality of the institution

or of its adequacy for the particular administration it serves. In some cases, this is based on published evaluations, whereas in others Intelecon is offering its own judgement, based on a rationale which is self-explanatory in the text (eg, in Zimbabwe, a possible opportunity for distance education stems from the telecommunications administration's need for technical upgrade training, combined with its consideration of a decentralised O&M structure for the future).

2.4 Regional Considerations

In addition to considering each country individually, various significant regional factors are included in the analysis. These are particularly important in the areas of inter-country telecommunications links, existing institutional ties and joint human resource development programs.

The prime example of regional cooperation amongst the twelve countries studied is the Southern African Development Coordination Conference (SADCC), which includes seven of the countries in this study, namely:

Botswana
Lesotho
Malawi
Swaziland
Tanzania
Zambia
Zimbabwe

This strong organisation, which includes also Angola, Mozambique and Namibia, is dedicated to the encouragement of economic independence for its members through the improvement of national and inter-country communications infrastructures and, flowing from this, the growth of inter-country trade and cultural ties. One arm of SADCC, the Southern African Transport and Communications Commission (SATCC) actively promotes cooperation amongst the telecommunications administrations of the region, in order to optimise their connectivity via the Pan African Telecommunications (Panaftel) microwave network and via satellite links. Key examples of SATCC's activities are the promotion of certain "regional" projects such as cross-border Panaftel links, international gateway exchanges and earth stations.

SATCC has also promoted cooperation in human resource development, through the implementation of joint training facilities, the organisation of special joint training courses and the arrangement of regional feasibility studies in these areas.

Another important regional factor is the strong role played by the International Telecommunications Union (ITU) trough the Panaftel project, support of maintenance activities and training. The

implication of the ITU as regards potential COL opportunities is also considered in the analysis.

2.5 Synthesis

The final conclusions and recommendations of the study are derived from a synthesis of all the above. The conclusions comprise an overview of the most likely candidates for a COL initiative. The recommendations indicate some specific project ideas or opportunities which have been identified as a result of the study, together with suggestions as to what steps should be taken, in order to take these ideas closer to implementation.

3.0 ANALYSIS

3.1 Country Comparison Model

A printout of the multi-attribute model referred to in Section 2.2 is provided in Appendix B.

The model consists basically of five general criteria, each of these comprised of three sub-criteria, or attributes. Each attribute is scored on a scale of 1 to 12; the top ranked country scores 12 and the lowest scores 1. The highest possible composite score in each category (assuming a top ranking of 12 for each attribute) is 36. The five general criteria used for the comparison carry equal weight as regards determining a suitable environment for distance education.

There is one prime exception to the rule. The criterion describing *Government Priority* in regard to investment in education and telecommunications has only two attributes. It therefore carries a lower weight (having a maximum score of 24), reflecting a slightly lower confidence level. This is because the figures on which Government priority are based can change from year to year, or they may not always be indicative of the Government's specific views on the subject of distance education.

One further departure from the rule is in the area of countries' *existing experience* in distance education. The scores here are allocated on a "1" and "0" basis for each attribute, as explained later.

The basic inputs to the model and the assumptions made in regard to the conditions considered favourable to distance education are as follows:

3.1.1 Developmental Need

The three factors considered are *per capita income, percentage of workforce in agriculture,* and *primary school enrolment* (as a percentage of the eligible population). These three provide a good cross-sectional view of developmental need, based on income level, human activity and education. Other indicators such as life expectancy or literacy could have been used, however these generally correlate strongly with one or more of the primary factors and therefore add little to the analysis.

For the purpose of the model, the highest scores are given to the lowest ranking countries. Thus countries with the greatest need score high.

The final scores indicate the most needy countries to be (in ascending order) Tanzania, Malawi, Uganda, Sierra Leone and Nigeria.

However, it should be remembered that the most needy countries developmentally may not necessarily be the top candidates for distance education initiatives. For example, countries with higher average literacy or secondary school enrolment may be better prepared to make effective use of distance educational technology than those generally described as the "most needy." Thus literacy and school enrolment have been used to define an additional criterion which counterbalances the effect of developmental need and helps to discriminate between countries as potential candidates for distance education, in the final analysis (see Section 3.1.5).

3.1.2 Geography and Demography

The factors considered are size (area), population density and urbanization level. The *normal* assumption has been made that prime candidates for distance education combine a relatively large area, sparse population density and low urbanization (ie, high rurality) and are scored accordingly.

Under this scenario, the highest ranked countries, in order, are Botswana, Tanzania, Kenya, Zambia and Uganda (the latter on account of its very low urbanization).

There may be alternative ways of viewing demography, however. For example, where limited resources have to be used optimally (as in COL's case), a strategist may consider *high* population density to be desirable. This would weight project choice towards achieving maximum outreach in terms of population. Hence an alternative scenario has been considered, with high scores for countries with a combination of large size, *high population density* and high rurality. This scenario favours Uganda, Malawi and Nigeria, followed by Kenya and Lesotho.

3.1.3 Government Priorities

Two factors - the percentage of GDP spent on education and the percentage of GDP spent on telecommunications - were used to provide an indication of Government commitment to education and to the telecommunications infrastructure, both of which are important elements in distance education. The figures are from the 1987 national accounts. Whereas some fairly major changes may have taken place since 1987 in one or two cases, the figures are, on the whole, indicative of the situation pertaining today.

These figures are typically reflected in the level of educational enrolment and the extent of the telecommunications infrastructure. However, they do not always indicate either a country's specific interest in distance education, or the quality of the telecommunications service (Malawi is a good case in point).

Although this criterion has been given less weight in the model's composite score, it is nevertheless important. For example, it may well provide an indication of whether wishful intentions can be turned into action.

The highest scoring countries on this criterion are Botswana and Swaziland, followed by Kenya, Lesotho, Zambia and Zimbabwe.

3.1.4 Infrastructure

This is composed of three separate criteria, each with three attributes, as follows:

Telecommunications

The indicators used here are telephone density (no. of telephones per 100 population), percentage of subscriber lines in rural areas, and quality of service. The latter is derived from a combination of published figures, the consultant's subjective knowledge, and other qualitative sources. Countries have been placed into one of three groups (high, medium and low quality).

The final scores indicate that the strongest telecommunications infrastructures are in Zimbabwe, Botswana, Zambia, Swaziland, Malawi and Kenya. All have a reasonable level of outreach into rural areas.

Radio Broadcasting

This criterion is composed of the published statistics on radio set penetration (sets per 100), area coverage of the national broadcast network, and number of broadcast hours per day.

The strongest radio broadcast infrastructures are in Nigeria, Swaziland, Malawi, Zimbabwe and Kenya.

Television Broadcast

This criterion is composed of the number of transmitters in the national service, the area coverage and the number of broadcast hours per day. The penetration of TV sets amongst the population was not considered, since it was assumed that a distance education scheme would not necessarily rely on private set ownership (rather on the learning centre concept).

Only eight of the countries in the group currently have a national television service. The strongest TV infrastructures are in Nigeria, Zimbabwe, Swaziland and Zambia, followed by Kenya and Sierra Leone.

Summary

Taken together, the highest scoring countries for *total infrastructure* are Zimbabwe, Nigeria, Swaziland and Kenya, followed by Malawi (despite its lack of a TV service), Zambia and Botswana (also without a national TV service).

3.1.5 Existing Experience or Interest

For this criterion, the existence of correspondence programs (from formal or non-formal educational institutions), of university or college outreach programs, or the use of distance education techniques (including schools broadcasts) are taken as positive signs for a potential COL contribution. An existing program in any of these three categories is given a "1" in the model, or a score of 10. If there is no evidence of an existing program, the country scores a "0" in that one area. Thus a country which has existing programs in all three would score 30, which corresponds closely to a high score under any of the other main criteria in the model.

All countries have an existing program in at least one category. The countries which have all three (and thus probably the highest potential for COL collaboration) are Botswana, Kenya, Nigeria and Zambia. The countries where two were identified are The Gambia, Lesotho, Malawi, Swaziland, Tanzania and Uganda.

All of the existing activities are described in detail in the country summaries of Appendix A. Appendix C provides an abbreviated tabular summary of the programs identified, for easy comparison.

3.1.6 Summary

A tabular summary of the conclusions derived from the country comparison analysis is provided in Appendix D. The conclusions are based on four different composite scenarios, which include all criteria plus the alternate effects of high or low population density, and the discriminating effect of higher literacy and educational enrolment.

The highest ranking countries, under all scenarios, on account of having positive features in virtually all criteria, are:

- Nigeria
- Kenya
- Swaziland

However, the quality and reach of Nigeria's rural telecommunications infrastructure is suspect, at least in some regions.

The following are ranked highly in consideration of their size and relatively low population densities, their higher levels of literacy, school enrolment and economic diversification (which contribute to their capacity to use the technology), their relatively strong infrastructures, and (in two cases) their existing level of interest in distance education:

- Botswana
- Zimbabwe
- Zambia

When considering the alternative demographic scenario that, for a developing country, high population density (including in the rural areas) can increase the outreach capacity and hence the benefits and cost-effectiveness of distance education, the following country has a moderate to high ranking, together with relatively strong telecommunications and radio broadcast infrastructures:

- Malawi

All of the above are therefore considered to be strong possibilities for COL.

In addition, the following countries have certain positive features, which rank them moderately:

- Lesotho
- Uganda
- Tanzania

However, the telecommunications infrastructure in the latter two countries is particularly weak at the present time.

3.2 Human Resource Development

3.2.1 General

Human resource development and training needs are significant in all of the countries studied. Given the stage of development of most African countries, the training of middle level professionals in large numbers is an immediate requirement. Also, high level and specialised advanced training in new technology areas needs to be improved and made more available. Comments included here are, on the whole, subjective assessments, based either on the consultant's direct experience (in the case of telecommunications) or on the desk research (in the case of broadcasting).

Some of the most pressing needs can be addressed regionally - especially in telecommunications, where significant regional activity is taking place. However, the following sub-sections highlight, first of all, the national opportunities identified.

3.2.2 National Telecommunications Opportunities

All of the countries studied have their own telecommunications staff training centres. These all function reasonably, albeit to varying degrees of excellence, with the probable exception of *Sierra Leone*. Also, it has been noted in the country summaries that technical training in *Gambia* may be in particular need of improvement (to match the needs of the relatively well organised telecommunications administration). Finally, *Zimbabwe* has been identified as a potential target for assistance, in view of severe shortcomings in the human resource complement and overall staff training program, and because of upcoming challenges which the administration will face if it pursues a decentralization policy.

In addition to these potential foci for COL interest, three regional opportunities have been identified for follow up, these involving the Southern African Transport and Communications Commission (SATCC), the Multi Country Training Centre (MCTC) in Malawi, and the ITU. These are described separately in Section 3.3.

The three national possibilities are the following:

Sierra Leone

It will be noted from the country summary in Appendix A that Sierra Leone's national telecommunications infrastructure is particularly weak and that the human resource element is one of the key areas in much need of development. However, since an amalgamation of the domestic and international telecommunications carriers, SLNTC and

SLET, is currently under consideration there will be both a special need and an opportunity to make significant human resource strides, through management restructuring and training. Since Cable and Wireless of the UK is en existing shareholder in SLET, much of the human resource development challenge could possibly be shouldered by them. Also, the European Commission has, in the past, contributed significantly to rehabilitation of the local network. Thus it is possible that the future training need will be handled without further outside assistance.

Apart from the identified human resource constraint on future network improvement, Sierra Leone did not otherwise rank highly in the country comparison as a favourable environment for distance education. Hence, the potential for COL assistance is, at this point, primarily in the area of infrastructural human resource development as a precursor to other kinds of involvement later.

Gambia

Gambia, like Sierra Leone, did not rank highly in the country comparison on any count. It is the smallest country in the group with a high population density and a very basic agricultural sector. Also, the rural telecommunications service is currently weak. However, it is known that the telecommunications administration, Gamtel, is planning a major expansion into rural areas over the next three to five years and that Gamtel is a reasonably well run organisation.

Training appears not to be highly developed, hence the sectoral conditions for assistance may be quite favourable and a distance education input, using outside curriculum resources, could be quite timely. However, further investigation would be required to confirm this and to identify the specific needs and parameters.

COL has apparently agreed to assist Gambia with provision of a low power FM radio system to provide linkages between the Gambia College in Banjul and other centres in the interior of the country. However, it has been noted that the Gambia Broadcast Service suffers from very severe manpower shortages (see next section). Thus, it would perhaps be appropriate for COL to investigate the possibility of contributing to human resource development in both the telecommunications and broadcast sectors.

Zimbabwe

A recent telecommunications sector study carried out in Zimbabwe by Intelecon, on behalf of CIDA, identified human resource development as a major area of need. Less than 70% of all jobs are currently filled (the figure is much lower for senior technicians and engineers) and there is

considerable loss taking place to industry. Whereas a similar analysis could be made for several countries in the group, the case of Zimbabwe is particularly acute because of several factors, namely:

- the economy is relatively sophisticated and has a need for high quality telecommunications
- the average education level of the workforce is high and there is a consequent need for career progress and upgrade training, as well as a good capacity to use advanced techniques
- the Zimbabwe PTC will face additional demands on its training program if it decides to decentralise its operations (as currently under consideration)

The primary area of need in the PTC is for upgrading of technicians who have received their basic training, but for whom there is no organised means of obtaining further qualifications, except from City and Guilds (UK) by correspondence. The result of this deficiency is slow progress to supervisory technician status, poor morale and staff wastage. A similar need exists for upgrading of graduate engineers.

During discussions with PTC officials in 1989, computer based or distance education concepts were welcomed as possible solutions. These would be particularly valuable in a decentralised environment, as PTC would be keen to offer equal training opportunities to its regionally based employees in the most cost-effective fashion. Since the initial regional training locations would likely be in centres where the network facilities pose no problem, any such training scheme developed to meet Zimbabwe's needs could be adapted to the requirements of virtually any telecommunications administration in the group.

The Southern Alberta Institute of Alberta (SAIT) has undertaken training trials involving computer managed learning (CML) systems at the Polytechnic in Gweru, and is known to have an interest in telecommunications training.

3.2.3 National Broadcasting Opportunities

Broadcast training in Africa, in most cases, has been haphazard and intermittent. Almost every broadcasting station has a training section, an in-service training program, or special regular arrangements for sending its people for training abroad. Some stations use all these methods.

The training of most personnel in educational broadcasting, from nearly all of the English speaking countries in Africa, used to be done at the Centre for Educational Development Overseas (CEDO) in London. This was

run in conjunction with the British Council. The programs at CEDO seem to have met with good success. However, such training has been largely discontinued since CEDO was absorbed into the British Council. Bilateral training among African countries is almost non-existent.

Some training of broadcast personnel takes place at Institutes of Mass Communication. Many of these Institutes were set up with the assistance of UNESCO. There were estimated to be about 30 mass communication training institutes in Africa in 1980. Some of the most well known include the Lagos University Department of Mass Communication; the University of Nairobi School of Journalism; the Kenya Institute of Mass Communication; the Kitwe Literature Centre (Zambia); the Zimbabwe Institute of Mass Communication; and the Tanzania School of Journalism. Most training centres are non-university institutions. They all suffer from a lack of financial and human resources.

The staffing of the centres is a significant problem. They are commonly dependent on foreign trainers and consultants; there is usually a high turnover of good local trainers. Another problem at training institutions is a lack of textbooks and materials. Much of the teaching material is foreign and often inappropriate to the local situation, and there is often inadequate, unsuitable or outdated equipment at the training centres.

Most broadcast training institutions in Africa were jointly established with the African Council for Communication Education (ACCE) which was set up with the assistance of, and works closely with, UNESCO.

Other international agencies which have assisted greatly in broadcast training in Africa include: the Commonwealth Broadcasting Association, the Friedrich Ebert Foundation, the Thompson Foundation, the Commonwealth Press Union and the Friedrich Nauman Foundation.

The countries which seemed to offer the best opportunities for human resource development projects by COL in the broadcasting sector include *The Gambia, Swaziland, Tanzania* and *Zambia*. These are described as follows:

The Gambia

As already noted, staff shortages in the broadcast services are severe. In 1981, as stated in the country summary in Appendix A, Gambia held only 25% of its required staff strength in broadcasting. Whereas the radio broadcast infrastructure in Gambia is relatively well developed, judging by the statistics, some assistance in the area of human resource development in broadcasting would consolidate the sector. Also, Gambia has demonstrated existing interest and experience in

distance education programs and so, despite its low ranking in the comparison model, there could be good possibilities for significant COL involvement.

Swaziland

The Swaziland Broadcasting Service has voiced their concern over inadequate training in the country. Currently, training for the sector is undertaken through the Department of Establishments and Training, which provides training to all government bodies. The training for the broadcast sector provided through these means has been insufficient for Swaziland's needs.

Unlike Gambia, Swaziland ranked highly in the country comparisons undertaken, making it a good overall candidate for consideration for assistance from COL in any case. Therefore, given its high ranking in terms of strong broadcast infrastructures (both radio and television), and its demonstrated interest in expanding its training capabilities in the sector, Swaziland could be considered a good candidate for assistance to consolidate its potential and develop future opportunities.

Tanzania

In the country comparisons undertaken, Tanzania ranked moderately overall as a candidate for consideration by COL. The country's developmental need is high, and it ranks amongst the top in terms of geography and demography as well.

Significantly, Tanzania could benefit from assistance geared to the broadcast sector. As outlined in the country summary section, Radio Tanzania undertook to decentralise its activities. The mainland portion of the country was divided into seven regional zones. To date, six of these zones have been designated to a Zonal Officer (or program producer). Plans for the future are to have full Radio Tanzania production teams and program production centres in each of the zonal areas.

It will be difficult for Radio Tanzania to accomplish this goal, partly due to existing staff shortages. The country is reported to have only 45% of its required staff strength. In order to alleviate these stresses, Tanzania has undertaken a variety of linkages to augment the basic training provided in the country. Linkages have been made with organisations including URTNA, BONAC, and the Commonwealth Broadcasting Association. Linkages in the form of personnel exchanges have also been undertaken within the region, including with the Voice of Kenya and Uganda. COL might, in fact, consider examining how it could assist both Tanzania and Uganda under an East Africa initiative.

Zambia

Zambia is not very well developed with respect to its radio broadcasting infrastructure, but fares quite well in television. In fact, television coverage in Zambia has been extended to all the country's provincial capital towns and plans are under way to supply television sets to some schools. Further, despite severe restrictions in capital and other resources, the Educational Broadcasting Service in Zambia has managed to expand and develop significantly, likely due to it being a well run organisation. Assistance to Zambia might therefore be considered a potential augmentation of radio service expansion.

In general terms, the country ranked highly overall for consideration by COL. COL could investigate the recently developed Zambia Institute of Mass Communications. There may be opportunities for incorporating a distance education component to some of the developments which are undoubtedly taking place in this new organisation. In general economic terms there is a great need in Zambia for job training among the large population of urban unemployed.

3.3 Regional Training Initiatives

3.3.1 Telecommunications

The following significant training initiatives hold potentially strong possibilities for COL collaboration. They are described here primarily for information purposes. As in the case of the national opportunities highlighted, further work would be required to define a clear role for COL. However, some potential ideas are included in the narrative.

Multi Country Training Centre (MCTC)

The MCTC, located in Blantyre, Malawi, is a joint venture between the telecommunications administrations of *Malawi, Botswana, Lesotho* and *Swaziland.* The centre was first established in 1975 with the assistance of the UNDP, ITU and the World Bank. Technical assistance and help with the running costs have been received over the years by the ITU and the European Commission. Whereas each of the four administrations carries out its own basic level training nationally, the MCTC offers intermediate level courses for the participants of all four countries. The centre is administered by a joint steering committee.

The centre is also used, on occasion, as the venue for broader SADCC regional training courses. For example, one CIDA sponsored regional course on satellite technology has been hosted at the MCTC and a further one is scheduled in 1991.

The centre has a staff of approximately 15 instructors and offers 40-50 courses per year for regional participants. Hostel style accommodation

is available for up to 100 students at any one time and laboratories are equipped with a range of switching and transmission equipment. At the present time the perception is that the MCTC needs to re-evaluate its mandate and role in the spectrum of regional training requirements. One problem is that it is not necessarily equipped as well as it could be, especially in the latest technologies. Consequently, the value of the MCTC is not unquestioned by the participants. Whether related to this or not, there has always been a problem of attendance, with Botswana, Lesotho and Swaziland at times not sending students to fill the places reserved for them.

It is recommended that COL consider the MCTC and the associated administrations as a possible focus for distance education ideas in the SADCC region. Three of the four countries involved were ranked highly in the country comparison and are therefore well suited to distance education technology. The fourth, Lesotho, was also ranked moderately and its telecommunications training centre is well equipped with advanced computer aided training systems. All four of the administrations could well be interested in the possibility of upgrading the MCTC to include a distance education component.

SATCC Training Activities

SATCC is an official SADCC organisation. Based in Maputo, Mozambique, it has a Technical Unit whose responsibilities includes the promotion of regional projects and the encouragement of operational collaboration in areas such as training. It is the coordinating body for initiatives of a broad regional nature.

SATCC supports a training program which is designed to provide instruction in advanced technology for senior technicians, professional engineers and middle to top management, as a supplement to administrations' own capabilities. As such, it is fulfilling a vital role and helping to plug gaps in the human resource situation in the countries of the region. The Governments of Canada, Sweden and Italy have been the prime technical and financial sponsors of SATCC's program. To date, emphasis has been placed in the areas of network planning, satellite technology and tariffs.

The following table summarises the courses carried out to date under the SATCC program. Total participation over the four years 1987-90 has been 144 students, from all of the member administrations. One of the potential benefits of distance education would be to cost-effectively increase the reach of these courses. Demand for these courses is still high, as some administrations are sending additional members of staff to attend similar courses outside the region.

Year	Course Title	Location	Sponsor	No. of students
1987	Satellite communications technology	Blantyre	CIDA	18
1988	Local networks planning, design of management	Harare	Italy	36
1988	Digital networks planning, design and management	Italy	Italy	15
1989	National telecoms network planning	Harare	SIDA	21
1990	Regional network and satellite technology planning	Maseru	CIDA	17
1990	Traffic, Tariffs and Accounting Procedures	Nairobi	AFRALTI & CIDA	20
1990	National telecoms network planning	Harare	SIDA	17

Since the region continually loses trained staff to industry or to other jobs within the administrations, there is a need to step up the volume of training undertaken. Thus, due to the demand and the successful results obtained from the courses so far, all three sponsoring Governments are continuing with their support of future courses.

Regional courses offer the opportunity for participants to exchange and share experiences with one another. The level of network development is different from country to country within the region, thus this kind of exchange is considered to be particularly valuable. However, a difficulty has been that because of staff movement and changes, it has not yet been possible to develop local counterpart lecturers and so decrease the region's dependence on outside help. Moreover, the SATCC Training Program has developed largely on an ad hoc basis, driven by requests from the region's administrations. SATCC is therefore now trying to formalise the program and hopes to commission

a study to determine the region's total training needs. This study will be conducted under Nordic funding and is expected to be completed in 1992.

In the meantime, CIDA sponsored a manpower and training needs evaluation study in the area of satellite technology during 1990/91, to assess the regional benefits of the two satellite courses already sponsored and to identify the requirements for future courses. The study findings, to be tabled within the next month, include recommendations on ways of establishing more permanent training expertise within the region as well as on the possible use of more cost-effective teaching methods. There is thus a possibility for COL to open dialogue with CIDA on the potential for use of distance education techniques in one of its future regional courses, as a pilot means of achieving cost-effectiveness. Judging from experience with CIDA to date, Intelecon believes that there might be some good ground for discussion with CIDA, especially if contacts are also established with the MCTC in Malawi. CIDA has twice used the MCTC facilities as a venue for regional courses.

ITU Training Activities

The ITU also provides a major input to most African countries as a provider of training experts, training course development and training facilities. It does this both through bilateral agreements with individual countries and through regional facilities and representatives located, for example, in Nairobi, Harare and Maputo (the latter serving the SATCC organisation).

One way the ITU hopes to contribute significantly to regional human resource development is through AFRALTI, the African Regional Advanced Level Telecommunications Institute. Located in Nairobi, AFRALTI is an ITU organisation which offers advanced engineering courses for telecommunications trainees from OAU member countries. AFRALTI is a relatively new organisation. At present, it is operating in temporary quarters with limited staff and equipment. A new building and state of the art equipment are planned for the near future. About 20 courses are currently offered by the institute.

CODEVTEL, which stands for Course Development in Telecommunications, is also an ITU organisation. It has been in operation for over a decade. One of CODEVTEL's activities is the Training Development Workshop through which course developers from administrations are trained. Training packages are produced that meet the immediate needs of the administration involved.

CODEVTEL also facilitates international cooperation among administrations in the exchange and sharing of course materials. This

activity is undertaken by the International Sharing System (ISS), administered by ITU's Training Division in Geneva. Under ISS in 1987, over 450 courses were available for sharing, with another 500 under preparation. The courses cover most major telecommunications disciplines such as engineering, operations, management, sales, training and some topics in broadcasting.

ISS is also involved with sharing of training materials, training resources (human, hardware and software), strategies and methods, management skills and so on, covering the whole field of human resource development. In 1987, 70 administrations were involved in the ISS interchange, comprising at least 10 administrations from industrialised countries (Europe and Japan), and a number of equipment manufacturers. Participation by LDCs remained low.

Both AFRALTI and CODEVTEL might be possible foci for COL interest in the East and Southern African regions. It is recommended particularly that COL investigate further the potential of using CODEVTEL materials in the area of telecommunications human resource development.

3.3.2 Broadcasting

Training abroad, at other African schools and in Europe and North America, has been important to broadcasting in Africa. Regional training programs are particularly important, due to the fact that any given country may not have more than two or three people at a time requiring training at a level beyond that offered at the local training institution. However, regional training has generally been sporadic and without planned continuity. One reason cited for deficient planning is the lack of a central body with the authority to undertake such planning. It has been suggested that URTNA, ACCE or the OAU Information and Broadcasting Ministers, or some other continental or regional structure, adopt this responsibility. However, beyond this Intelecon has no direct knowledge of regional institutions involved in broadcasting development.

Certainly, regional coordination of advanced communication, education and training centres, such as university departments or schools could also benefit both individual countries and the region generally. Given the need to consolidate human resource development in the broadcasting sector generally, further investigation of a potential COL role may be warranted.

4.0 INTER-COUNTRY CONNECTIVITY

4.1 Introduction

In this section, we consider the potential support for regional distance education initiatives which could be gained from inter-country telecommunications network linkages.

As a general rule, telecommunications connectivity between countries in Africa is not strong. It is virtually non-existent between East or Southern Africa and West Africa, without transiting Europe via satellite. This has hindered inter-country cooperation in broadcasting, for example. It inevitably also increases any difficulties associated with inter-agency linking in distance education. In almost every case where *regional* connections are anticipated, it would be wise to make extra allowance for the cost and delay of implementing adequate intra-country network facilities.

4.2 Panaftel

Unfortunately, even contiguous countries linked by the Panaftel network have often been unable to establish satisfactory links, due to lack of multiplex equipment on the interconnecting routes. However, in Southern Africa the SADCC countries have been more successful in establishing terrestrial links on Panaftel. Also, their links with Kenya via the Zambia-Tanzania-Kenya route, and potentially with Uganda (via Kenya) are reasonable.

Figure 4.1 shows the Panaftel network in East and Southern Africa. The heavier lines indicate cross border links recently completed under SATCC sponsorship.

4.3 Satellite Connectivity

In addition to Panaftel, all of the SADCC countries, indeed all of the countries under study, have Intelsat Standard A or B Earth Stations. However, although these usually have relatively large groups of circuits to European countries, the USA and Canada, few as yet connect with one another, on account of their using different Intelsat satellites, or because of incompatible radio modulation techniques (eg, SCPC, FDM, TDMA).

Although there is a SATCC regional project to promote intra-regional satellite connectivity, actual progress is slow and is not expected to result in many additional circuits over the next few years. The SATCC connectivity project is attempting to develop Zambia and Zimbabwe as the key regional transit locations, to replace South Africa and Europe (primarily the UK). However, delays to the funding of the next stage, and

the expected solution to the South African internal situation in the near future (which removes some of the political imperative for alternate transit arrangements) have tended to slow down this expensive project.

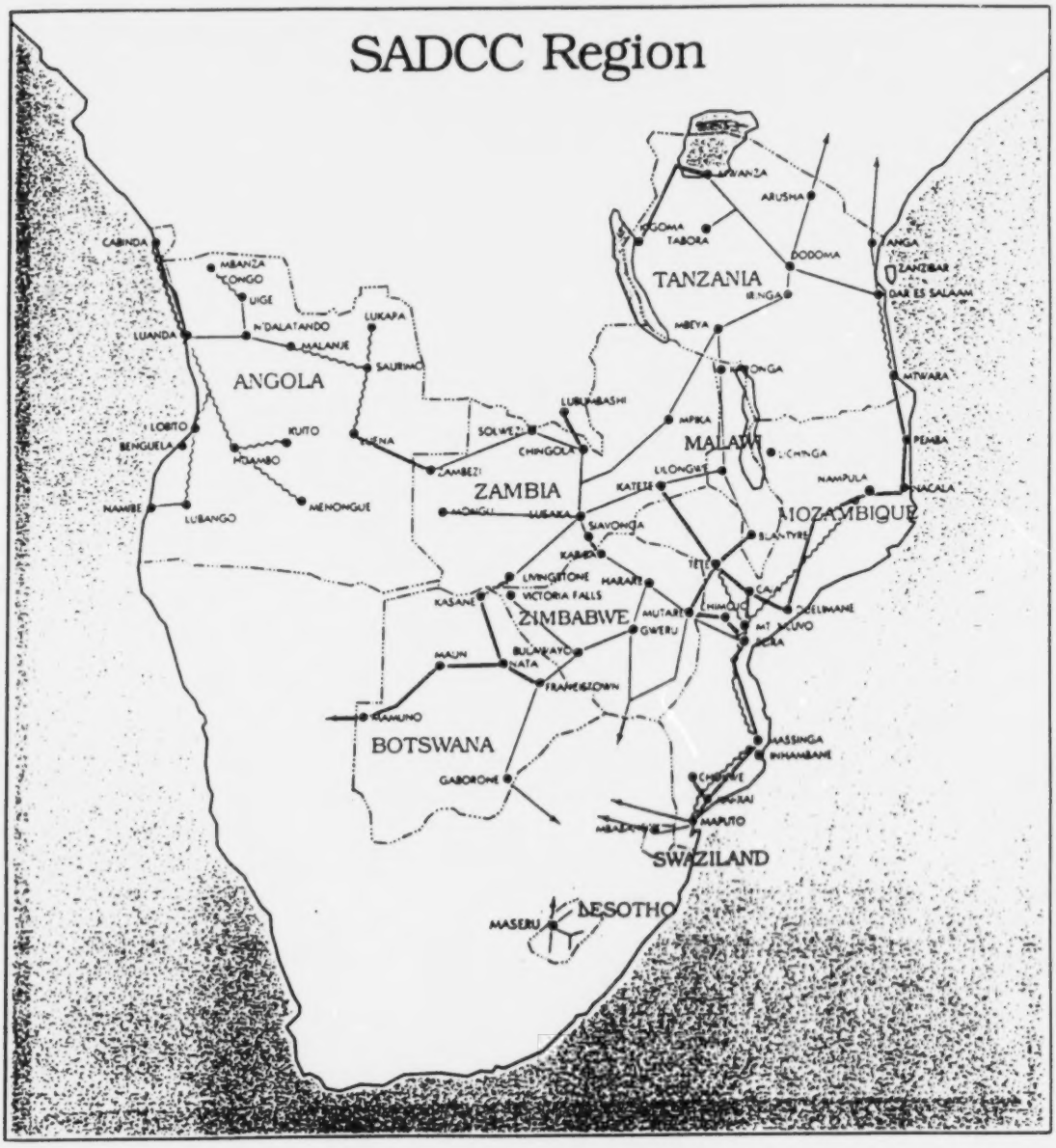


FIGURE 4.1: PANAFTEL NETWORK

4.4 Regional Circuits Available in East & Southern Africa

The following table provides information on the number of direct circuits (both Panaftel and satellite) between the countries in this study and summarises the quality of the links, indicating where congestion definitely or probably occurs.

FROM	TO	BOT	GAM	KEN	LES	MAL	NIG	S.LNE	SWZ	TNZ	UGN	ZAM	ZIM
BOTSWANA	Direct											16	50
	Transit		UK	UK	RSA	ZIM	UK	UK	RSA	UK	UK		
	Quality											*	*
GAMBIA	Direct												
	Transit	UK		UK	UK	UK	UK	UK	UK	UK	UK	UK	UK
	Quality												
KENYA	Direct									6+	N/A	N/A	5
	Transit	UK	UK		UK	UK	UK	UK	UK				
	Quality									***	***	**	**
LESOTHO	Direct												
	Transit	RSA	UK	UK		UK	UK	UK	12	UK	UK	UK	4
	Quality								**				*
MALAWI	Direct										4	20	28
	Transit	RSA	UK	UK	RSA		UK	UK	RSA	UK			
	Quality										*	***	***
NIGERIA	Direct												
	Transit	UK	UK	UK	UK	UK		UK	UK	UK	UK	UK	UK
	Quality												
S.LEONE	Direct												
	Transit	UK	UK	UK	UK	UK	UK		UK	UK	UK	UK	UK
	Quality												
SWAZILAND	Direct				11								
	Transit	RSA	UK	UK		RSA	UK	UK		UK	UK	RSA	RSA
	Quality				**								
TANZANIA	Direct			6+		4					N/A	11	2
	Transit	UK	UK		UK		UK	UK	UK				
	Quality			***		**					**	***	**
UGANDA	Direct			N/A						N/A			
	Transit												
	Quality			***						**			
ZAMBIA	Direct	18		N/A		20				14	N/A		60
	Transit		UK		RSA		UK	UK	RSA				
	Quality	**		**		**				***	**		***
ZIMBABWE	Direct	50		5	4	28				3		50	
	Transit		UK				UK	UK	RSA		KEN		
	Quality	**		**	**	***				*		***	

Legend: * Route heavily congested ** Route sometimes congested *** No congestion

It will be noted from this table that even in the SADCC region, the number of direct inter-country relations for normal public network services is not extensive. In particular, there are few direct relations established between non-contiguous countries, often because the quality of long distance Panaftel circuits has not been particularly high and, as already noted, the region's earth stations are generally not inter-linked. However, it is also due to weak planning and coordination between countries. Many regional routes still transit European locations. Also, several of the routes which do have direct circuits are congested. Hence, the availability of additional circuits for distance education purposes cannot be guaranteed without coordinated expansion of the routes by the administrations concerned.

One encouraging sign is that the Southern African Telecommunications Administrations (SATA), in cooperation with SATCC, recently completed a tariff study, which concluded that regional tariffs need to be reduced and harmonized, in order to encourage inter-country traffic. The basic recommendations were accepted and the logical next step must be to increase the facilities between countries to handle more traffic.

4.5 Summary

The African regional networks do not, at this stage, offer too much encouragement to the use of distance education techniques between countries, except in a few cases involving neighbouring countries. However, recent moves towards offering tariff inducements to regional traffic are an encouraging sign for the SADCC region at least.

Since the Southern African Telecommunications Administrations (SATA) do have regional procedures for coordinating inter-country requirements, there is every possibility that links could be established successfully, given sufficient advance notice and exertion of some pressure regionally. However, where the establishment of additional circuits would require new multiplex equipment to be purchased, COL would be advised to offer to provide the foreign exchange finance for the implementation of the facilities.

APPENDIX A: COUNTRY SUMMARIES

BOTSWANA

Botswana seems to enjoy a low population density, relative to the other countries under study. These figures are somewhat misleading, however, because a narrow strip on Botswana's eastern border is densely populated (up to 17.2 people/km^2), while other areas are very sparse indeed (0.14 people/km^2). Even then, the country is characterised as having a fairly low population spread over a large land area. Botswana's level of urbanisation and urbanisation growth rate are about average.

POPULATION	1.1 million
POPULATION GROWTH RATE	3.3%
AREA	582,000 sq km
POPULATION DENSITY	1.9 peo/sq km
URBANISATION	21%
URBANISATION GROWTH RATE	8.1%

Botswana's economy is relatively healthy by African terms, having been buoyed up by diamonds, the country's number one export. GDP per capita is significantly higher than that in any other African Commonwealth country and is growing at a fast rate.

Even though the majority of Batswana are rural, only a small proportion of GDP is represented by agricultural production. Industry assumes the largest share due primarily to activities relating to diamonds. Of all the countries being studied, Botswana has the most active mining industrial sector.

GDP (millions US$)	1520
GDP per capita	1382
GDP Growth Rate (1980-87)	13%
GDP Growth Rate (1987-89)	8.5%
Distribution of GDP	
Agriculture	3%
Industry	57%
(Manufacturing)	(6%)
Services etc.	40%
Portion of budget spent on	
Education	8.7%
Telecoms	7.7%

Government expenditure in Botswana supports the interests of the Commonwealth of Learning's Distance Education ideals. Government spends a greater proportion of its budget on education and telecommunications than any other of the African Commonwealth countries currently under study.

The literacy rate in Botswana is reasonably high by African standards. Only three of the countries under study outstrip Botswana in their level of literacy. Males enjoy only a slightly higher literacy rate than females. Botswana is one of only five countries in this study which has at least 100%

enrolment at primary school level.[1] Secondary level enrolment in Botswana is exceeded by only two other countries, namely Zimbabwe and Swaziland. At the tertiary level, only three countries (Zimbabwe, Swaziland, and Uganda) surpass Botswana's enrolment. Enrolment is not compulsory in Botswana.

Botswana offers correspondence courses through the Botswana Extension College, a section of the Department of Nonformal Education. Fifteen study centres are in operation throughout the country for correspondence students. The Nonformal Education Centre at Matsha Community College in Kang has played an important role for both the Department of Nonformal Education and for nonformal education in general in Botswana. Up to May 1984, the correspondence unit had an enrolment of 9,506 students.

At the University of Botswana, the Institute of Adult Education is heavily committed to outreach programs. The Rural Extension Coordinating Committee is the liaison body through which coordination of projects (initiated both by the various ministries and the University College) is achieved.

There is an active Schools Broadcasting Service in Botswana. The Department of Curriculum Development and Evaluation's Educational Broadcasting Unit produces radio lessons in various subjects based on the schools' syllabi. It also prepares visual aids to accompany radio lessons. The Department's planned activities during National Development Plan 6 (NDP6, 1985-1991) included the production of recorded lessons on tapes, particularly for the junior secondary schools.

LITERACY RATES (%)	
Total	70.8
Males	72.6
Females	69.5
PERCENTAGE OF AGE GROUP ENROLED IN EDUCATION (1986)	
PRIMARY	
Total	105
Males	101
Females	109
SECONDARY	
Total	31
Males	29
Females	33
TERTIARY	
Total	2.2

Correspondence courses are offered through the Botswana Extension College. Outreach programs are available through the University of Botswana.

The Broadcasting Unit of the Department of Curriculum Development produces radio programs, recorded lessons on audio tapes and support materials as teaching aids for teachers in Botswana.

The telecommunications infrastructure in Botswana is currently undergoing rapid expansion (at a rate of about 30% per year between 1987 and 1989). In general, it can be stated that the country has a relatively well developed and

[1] Figures are expressed as ratio of pupils to population of school-age children. For some countries, gross enrolment ratios may exceed 100% because some pupils are younger or older than the stated school-age.

DIRECT EXCHANGE LINES	
Capacity	26,330
DELs in use	14,590
Per 100	1.22
Residential	38%
Automatic	98%
Wait list	2,950
Demand	17,540
TELEPHONE SETS	
Number	26,650
Per 100	2.22
Urban	88%
Quality of Service	**88.7%**

high quality telecommunications infrastructure in comparison to the other African Commonwealth countries under study. The Botswana Telecommunications Corporation (BTC) has been managed by Cable and Wireless of the UK since the early 1980s and this has underpinned BTC's development with a strong emphasis on planning, service quality and maintenance disciplines.

Under its Main Development Plan, which commenced in 1984, BTC has been able to create a fully digital network at the switch and long distance transmission levels. Telecommunications penetration, both in terms of direct exchange lines (DELs) per 100 population and telephones per 100, is relatively high. Swaziland and Zimbabwe are the only two countries that exceed Botswana.

Like most of the other countries, Botswana has a low percentage of rural telephones, sitting fifth in rank. What rural service exists is limited to communities within the more populated eastern corridor of the country. However, BTC has under way a national rural telecommunications development plan which will bring basic telephone service to 200 villages (all those with populations exceeding 500) by the year 2000. To date, approximately 20 of these villages are already served by multi-access radio systems. There are very few open wire facilities remaining in Botswana. Almost all rural areas with service are served by subscriber radio from digital exchanges, although some remote communities in the west of the country are still served by an HF radio-call service.

FACSIMILE	
Bureaufax	2
Telefax	120
DATA TERMINALS	63
LEASED CIRCUITS	289
TELEX SUBSCRIBER LINES	740

Botswana's broadcasting infrastructure is about average for the group. There is a single broadcast service in Botswana, Radio Botswana. Population coverage is about average for the region and area coverage is relatively high, despite the country's large size.

With respect to television broadcasting, Botswana ranks in about the middle in terms of number of television receivers per 100 people. However, television reception is from South Africa. There is no television infrastructure in the country as yet: no transmitters exist and no television services originate within Botswana.

Telecommunications training in Botswana is provided by a number of sources. BTC operates its own telecommunications Technical Training Centre. The

Centre, located in Gaborone, had a staff of 6 instructors in 1987. It offers about 20 courses, varying in duration from a few days to several weeks. The Centre's small but well equipped external plant section provides basic and intermediate training for cable jointing, aerial cable construction, local distribution and subscriber apparatus fitting and maintenance. The technical training section provides basic and intermediate electronics and telecommunications training (based on the "City and Guilds" program). This section has a well equipped basic electronics and digital logic laboratory.

The Centre is also actively involved in linkages to enhance training opportunities. It coordinates with the Botswana Institute of Administration and Commerce and the local branch of the Institute of Development Management for administrative and management training.

Besides the Technical Training Centre, Botswana operates a joint training centre with Malawi, Lesotho, and Swaziland under the name of Multi Country Training Centre (MCTC). This centre is located in Blantyre, Malawi. For specialized training and training beyond that generally offered by local staff training centres, BTC participates in regional programs provided at the Central Training School (CTS) and the ITU's African Advanced Level Training Institute (AFRALTI), both in Nairobi. These facilities are described in the report sections dealing with the countries which house the facilities.

Training is also available in the broadcasting sector. This incorporates both in-service and formal training (the latter offered at the Training Unit), running concomitantly. The Training Unit has equipment and an adviser from the Friedrich Ebert Foundation in West Germany. Training is at basic and

RADIO BROADCASTING	
Receivers	
Number	150,000
Per 100	13.27
Rank	6th
Transmitters	
MF	1
HF	1
VHF	8
Total	10
Ownership	Gov't
Channels	1
Daily Hours	17
Rank	4th
Coverage	
Population	70%
Area	80%
TELEVISION BROADCASTING	
Receivers	
Number	8,000
Per 100	0.71
Transmitters	None

TELECOMMUNICATIONS TRAINING

Training is available from a number of sources. BTC operates its own Technical Training Centre. The Centre is also actively involved in linkages with the Botswana Institute of Administration and Commerce and the local branch of the Institute of Development Management to enhance training opportunities.

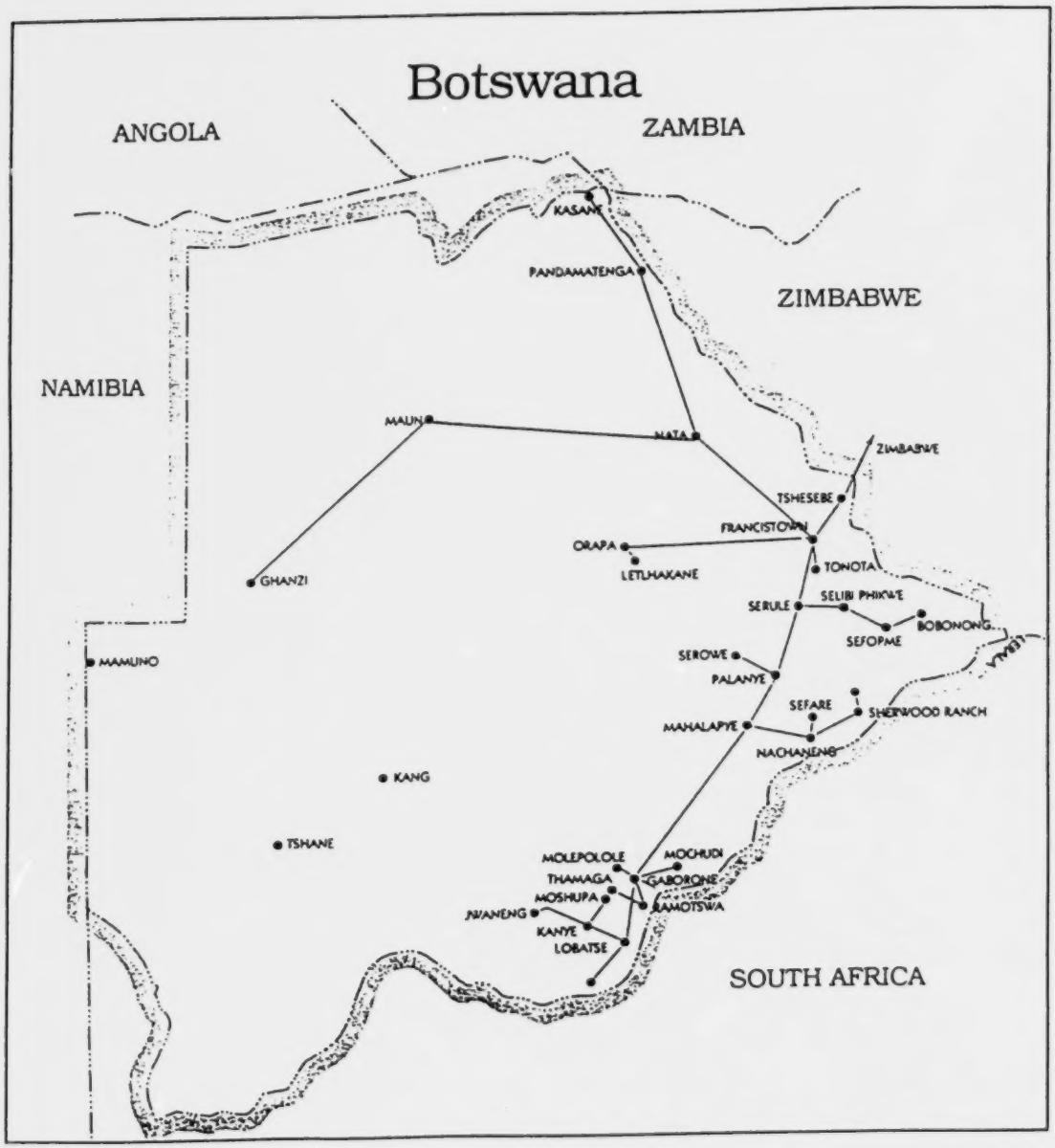
Botswana also operates the Multi Country Training Centre (MCTC) jointly with Malawi, Lesotho, and Swaziland.

intermediate levels. Upgrading courses to mid-career level are also organised. The Training Unit provides induction courses, short refresher courses, and post experience courses as well. Seminars are held several times a year for the benefit of the staff of Radio Botswana. Most of the efforts are geared to the upgrading of the mass communication skills of broadcasting personnel.

BROADCAST TRAINING

The Training Unit provides mostly formal training at the basic and intermediate levels. Informal in-service training runs concomitantly. Other courses are organised. The Unit has established a number of linkages to enhance training opportunities. These include linkages with the University of Botswana and the Botswana Polytechnic.

Future developments in broadcast training are also in the works. According to NDP6, a comprehensive in-house and external training scheme has recently been approved, and as a consequence, the Training Unit will be expanded to approximately four full-time staff, with corresponding improvements to buildings and equipment. During NDP6 it is hoped that the nucleus of a Mass Media centre can be established at the University of Botswana, allowing training tailored to Botswana's needs up to diploma/degree level. In the meantime, linkages are being utilised: primarily, these include using lecturing staff from the University to assist with the Department's own Certificate courses. Also, engineering training will continue at the Botswana Polytechnic.



EXISTING DIGITAL TELECOMMUNICATIONS NETWORK

THE GAMBIA

Gambia has the second lowest population in numbers of all the countries under study, but ranks second highest for population density. Population growth and level of urbanisation are at rates paralleling those of most of the other countries. The urbanisation growth rate is on the high side.

POPULATION	800,000
POPULATION GROWTH RATE	3.3%
AREA	11,000 sq km
POPULATION DENSITY	72.5 peo/sq km
URBANISATION	21%

Economically, Gambia is not in a favourable position. Its GDP per capita places the country in about the middle of the group, but the growth rate during 1980-89 was the second worst, followed only by Nigeria.

Gambia is the country in this study with the largest portion of its GDP accruing to services. This is largely because of the country's small size and unique geography, with the economy dominated by the capital region. Also, Gambia's agriculture is relatively undeveloped and only two countries of the group have less active industrial sectors.

GDP (millions US$)	275
GDP per capita	345
GDP Growth Rate (1980-87)	-0.8%
GDP Growth Rate (1987-89)	
Distribution of GDP	
Agriculture	25%
Industry	10%
Services etc.	65%
Portion of budget spent on	
Education	2.4%
Telecoms	2.4%

Government expenditures on education place Gambia in a poor light as only three other countries spend less on this sector than Gambia. The proportion of budget spent on telecommunications expenditures is better. Gambia ranks fourth in these terms, and GAMTEL, the operating administration, is a relatively well run corporate entity.

The overall adult literacy rate in Gambia is the lowest for the group save for Sierra Leone. Gambia also ranks low in terms of school enrolment at the primary and secondary school levels. Males have higher literacy rates and are also much more likely to be enroled at the various educational levels.

Gambia is moving towards increased use of communications technologies for educational purposes. Schools broadcasting at the primary level commenced in 1979. At the same time, the Rural Broadcasting and Adult Education Section was created to be responsible for a variety of programs and services. A second radio channel is planned and, once operational, one channel will be

devoted to Schools Broadcasting and general English programs while the other will carry all local language programs, rural broadcasting and adult education.

The telecommunications infrastructure in Gambia is not very well developed, comparatively speaking, in terms of the number of DELs per 100 and density of telephones per 100. However, the number of lines has tripled since the formation of GAMTEL, a somewhat commercially oriented operating entity, in 1984. The quality of service in Gambia varies. Within the greater Banjul area, recently installed Alcatel digital exchanges offer fairly good service quality. However, the outlying areas still have very poor service quality. The main provincial towns currently have Strowger electromechanical exchanges, however, the main constraint on service is the poor operating condition of the existing backbone radio system. Energy problems cause many interruptions, as does a shortage of spare parts. There is a current project to install digital exchanges in the seven key regional centres, plus a modern backbone transmission system. However, the project is currently only at the funding agreement stage and is therefore at least three years from completion. Rural areas are currently served mostly over open wire from manual switchboards, if at all.

LITERACY RATES (%)

Total	24.9
Males	35.6
Females	15.1

PERCENTAGE OF AGE GROUP ENROLED IN EDUCATION (1986)

PRIMARY	
Total	67
Males	82
Females	52
SECONDARY	
Total	17
Males	24
Females	11

The Commonwealth of Learning has agreed to assist with a "low power FM radio" system to provide linkages between The Gambia College and other centres in the interior of the country.

A second radio channel is soon to be commissioned in Gambia. When operational, one channel will be devoted to Schools Broadcasting and General English Programs.

With respect to radio broadcasting, Gambia ranks within the top five of the group on all counts: number of receivers per 100 (fifth); number of hours of daily broadcasting (fifth); population and area coverage (both place fourth).

There is no television service in Gambia.

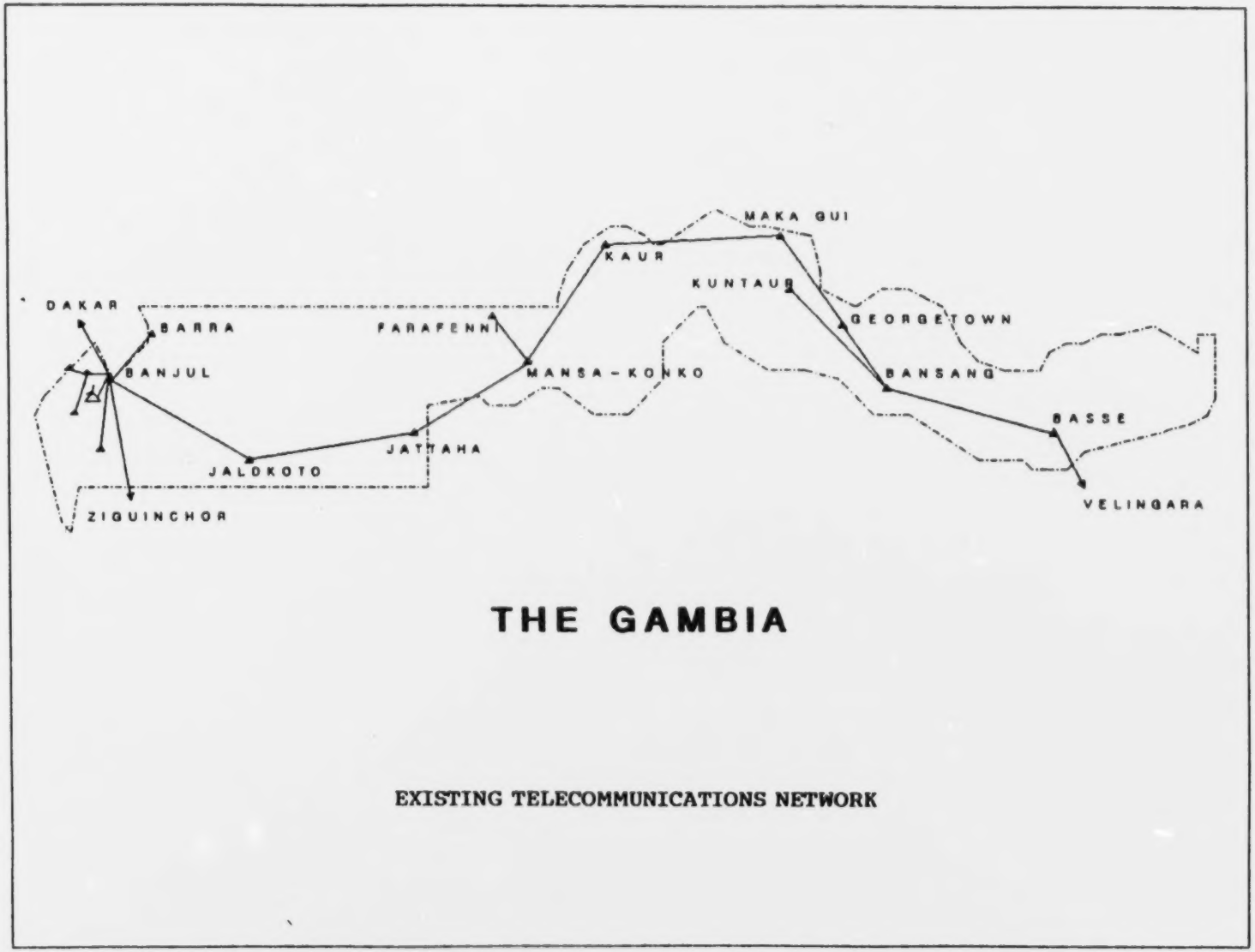
Although most of the countries of the study group suffer from staff shortages in broadcasting services, the Gambia Broadcasting Service suffers some of the most severe shortages of all: in 1981, it was reported that Radio Gambia had only about 25% of its required staff strength.

Technical training is generally weak in Gambia, even on African standards. In the telecommunications sector, a training centre exists but is not, at this

DIRECT EXCHANGE LINES	
Capacity	6,560
DELs in use	5,180
Per 100	0.63
Residential	66%
Automatic	98%
Wait list	3,170
Demand	8,350
TELEPHONE SETS	
Number	7,210
Per 100	0.88
Urban	94%
OTHER SERVICES	
Leased circuits	3
Telex subsc. lines	140

RADIO BROADCASTING	
Receivers	
Number	115,000
Per 100	14.38
Rank	5th
Transmitters	
MF	5
HF	
VHF	2
Total	7
Ownership	Govt/Com
Channels	1
Daily Hours	15
Rank	5th
Coverage	
Population	70%
Area	60%

point, well developed. Most of GAMTEL's qualified engineers and technicians have received their training overseas, in France or the UK.



THE GAMBIA

EXISTING TELECOMMUNICATIONS NETWORK

KENYA

Kenya has a middle to low population density relative to the other Commonwealth African countries, but the population growth rate in the country is the highest. Urbanisation rests at a fairly moderate level, though, again, urbanisation growth rate is one of the highest for the group.

POPULATION	22,100,000
POPULATION GROWTH RATE	3.9%
AREA	583,000 sq km
POPULATION DENSITY	37.9 peo/sq km
URBANISATION	22%
URBANISATION GROWTH RATE	8.6%

Economic performance in Kenya is among the best for the countries under study, its GDP per capita ranking fifth in the group , and GDP Growth Rate resting at the third rank position.

Kenya has a fairly well diversified economy. Agriculture continues to be the economy's mainstay but tourism is gaining in importance. Manufacturing activities cover a broad range.

GDP (millions US$)	6930
GDP per capita	314
GDP Growth Rate (1980-87)	3.8%
GDP Growth Rate (1987-89)	
Distribution of GDP	
Agriculture	31%
Industry	19%
(Manufacturing)	(11%)
Services etc.	50%
Portion of budget spent on	
Education	5.8%
Telecoms	0.9%

Budget expenditures dedicated to educational development are quite respectable in Kenya. Kenya ranks third overall for such spending. The budget reserved for telecommunications development cannot be viewed as positively. The level of expenditure on telecommunications is relatively low by world standards, and places Kenya in the seventh rank position for the group, although major telecommunications developments are taking place and the telephone network is relatively extensive.

The literacy rate in Kenya is on the middle to low side. The percentage of age group enroled in primary education is more positive: over 90% enrolment has been achieved here. Enrolment is not compulsory in Kenya at any level.

Kenya's main nonformal education program, the mass literacy program, is geared towards alleviating its low literacy problem. The main objective is to prepare students for more development work-oriented continuing education. The continuing education program is a literacy program for those wishing to pass public examinations at the primary education level and higher levels. Radio and the rural press are extensively used in literacy programs for

mobilization of illiterate masses and literacy teachers.

Correspondence education is provided through the College of Adult and Distance Education of the University of Nairobi. The College conducts extramural studies for people preparing for professional examinations in areas such as commerce and accounting as well as national academic examinations.

The Voice of Kenya (VOK), under the Ministry of Information, broadcasts school programs prepared for the Schools Radio Program by the Kenya Institute of Education (KIE) in Nairobi. Radio and audio cassettes are used extensively to support education. Schools can send up to 300 tapes that the Educational Media Service of the KIE will prepare using high speed dubbing equipment.

Planning initiatives by the government look towards improving the availability of correspondence education. It is hoped that correspondence courses and radio education will be introduced for those who wish to pursue higher education up to degree level.

With respect to the basic telecommunications infrastructure, Kenya ranks fifth within the group for the number of DELs per 100 population. Major expansion of the telecommunications network has taken place since 1985. Now, up to half of the country's exchange lines are digital and the main interconnecting transmission systems are also digital. Over the same period, more than 110 digital rural exchanges have been installed by British Telecom as part of the government's rural development thrust. Kenya Posts and Telecommunications Corporation (KPTC) development plans for the period 1984-89 also emphasized strengthening management systems.

During the 1989-93 plan period, KPTC plans steady growth in both urban and rural exchange capacity. By the year 2000, it is expected all rural and urban exchanges will have been digitalised.

LITERACY RATES (%)	
Total	59.2
Males	69.6
Females	49.2

PERCENTAGE OF AGE GROUP ENROLED IN EDUCATION (1986)	
PRIMARY	
Total	94
Males	97
Females	91
SECONDARY	
Total	20
Males	25
Females	15
TERTIARY	
Total	0.8
Males	1.2
Females	0.4

The University of Nairobi College of Adult and Distance Education is the main sponsor of extramural studies and includes a correspondence course unit.

Radio is extensively used in literacy programs. Also, the Voice of Kenya (VOK), part of the Ministry of Information, broadcasts school programs prepared by the Kenya Institute of Education (KIE).

DIRECT EXCHANGE LINES	
Number	224,160
Per 100	0.70
In use	157,360
Residential	42%
Automatic	92%
Wait list	63,890
Demand	221,250
TELEPHONE SETS	
Number	337,010
Per 100	1.5
Urban	93%

For rural and remote areas, KPTC wants to extend the network with modern but low cost technologies. Automating the rural telephone system is a top priority for the 1989-93 plan period. Specific activities include equipping all administrative district headquarters with low capacity digital exchanges. A total of 330 digital rural exchanges, with a capacity of 128,100 lines, is expected to be installed during the 1989-93 plan period. Also 2,500 public telephones will be installed.

Future plans, which include the introduction of a public packet switching network and a public mobile telephone service, reflect the relatively advanced nature of the Kenyan business sector, which is akin to that of Zimbabwe. The main switching centres and trunk network will continue to be digitalized over the next few years.

Kenya rests in the mid range in terms of number of radio receivers per 100 people but has a relatively extensive radio broadcasting network. The service consists of two channels, the National Service (broadcasting in Kiswahili) and the General Service (in English). In addition, there are three shared channels which broadcast programs in sixteen vernacular languages. Most of these services are transmitted simultaneously on short wave, VHF/FM and medium wave. For about five years, a rural community FM radio station called "The Home Bay" has also been on the air. It broadcasts in the local language but can access the main channel for national news. This is a joint experiment with UNESCO.

Kenya's television service broadcasts for six hours daily. Coverage by population is moderately high, but is mostly to urban dwellers. The television service operates in English and Kiswahili. There are

RADIO BROADCASTING	
Receivers	
Number	2,000,000
Per 100	9.05
Rank	8th
Transmitters	
MF	11
HF	3
VHF	2
Total	16
Ownership	Gov't
Channels	2
Daily Hours	18
Rank	3rd
Coverage	
Population	90%
Area	88%
TELEVISION BROADCASTING	
Receivers	
Number	125,000
Per 100	0.57
Transmitter	5
Ownership	Gov't
Channels	1
Daily Hours	6
Coverage	
Population	45%
Area	10%

television and film production facilities in the country. The television station in Mombasa produces and broadcasts a large number of local programs.

Telecommunications training receives high priority in Kenya. KPTC operates two training schools, namely Central Training School (CTS), in Nairobi and Kenya Training School, in Kabete. The Kenya Posts and Telecommunications' CTS in Nairobi provides a wide range of useful courses and is reported to be well managed and economical. It has reasonably current training equipment and well trained instructors. This training facility is open to other countries in the region.

FACSIMILE	
Bureaufax	**4**
Telefax	**203**
DATA TERMINALS	**2530**
LEASED CIRCUITS	**2840**
TELEX SUBSCRIBER LINES	**2530**

Basic telecommunications training is available at colleges of technology including Kiambu Institute of Science and Technology, Rift Valley Institute, Western College (WECO) and at a former post office centre in Mombasa. Courses offered include outside plant technician training.

Kenya is also the home of AFRALTI, the African Regional Advanced Level Telecommunications Institute, which offers advanced engineering courses for trainees from throughout the region. AFRALTI is a relatively new organisation. At present AFRALTI is operating in temporary quarters in Nairobi with limited staff and equipment. A new building and state of the art equipment are planned for the near future. AFRALTI offers advanced level training to all OAU member countries. About 20 courses are offered at this training facility.

TELECOMMUNICATIONS TRAINING

The Kenya Posts and Telecommunications Corporation operates two training schools, the Central Training School and the Kenya Training School. Basic telecommunications training is also available at colleges of technology throughout the country.

Kenya also houses the African Regional Advanced Level Telecommunications Institute (AFRALTI).

Acquiring the needed trained personnel for broadcasting has been one of the most difficult tasks facing the growing broadcast sector. Supply has not been able to meet demand. Training of personnel for broadcasting is the responsibility of the Voice of Kenya. The VOK has a training scheme which incorporates both formal and in-service training components. Formal

BROADCAST TRAINING

Training of broadcast personnel is the responsibility of the VOK. Training takes place at the Kenya Institute of Mass Communication.

training is undertaken at the Kenya Institute of Mass Communication (KIMC), or the School of Journalism of the University of Nairobi.

LESOTHO

Demographically, Lesotho does not differ significantly from its African Commonwealth counterparts, except in terms of its relatively low population growth rate.

POPULATION	1,600,000
POPULATION GROWTH RATE	2.6%
AREA	30,000 sq km
POPULATION DENSITY	53.3 peo/sq km
URBANISATION	19%
URBANISATION GROWTH RATE	7.2%

Lesotho's GDP per capita is one of the lowest of the region, with only Malawi and Tanzania at a lower level. The outlook is also not particularly good, although Lesotho's economy is closely tied to South Africa. The country is dependent on its adults being able to migrate to South Africa for employment and remit their incomes to Lesotho.

Budget expenditures in the area of education and telecommunications are moderate to low, and rank fifth each relative to expenditures by the other countries under study.

GDP (millions US$)	270
GDP per capita	169
GDP Growth Rate (1980-87)	2.3%
GDP Growth Rate (1987-89)	5.5%
Distribution of GDP	
Agriculture	21%
Industry	28%
(Manufacturing)	(15%)
Services etc.	51%
Portion of budget spent on	
Education	3.8%
Telecoms	2.1%

Despite the poor economic outlook in Lesotho and relatively low education expenditures, the country is one of the top ranked in the region in terms of literacy, with women's literacy exceeding that of men. Only Tanzania and Zimbabwe surpass Lesotho in rate of adult literacy. At the primary school level, Zimbabwe is the sole country to have a higher enrolment rate; both countries have rates in excess of 100% at the primary level. Enrolment is compulsory in Lesotho for children aged 6 to 13 years.

The Lesotho Distance Teaching Centre (LDTC), a division of the Ministry of Education, was established in 1974 with the help of the International Extension College. Its main aim has been to expand the use made of distance teaching methods in Lesotho. Its activities include correspondence courses at JC (junior certificate) and C.O.S.C. (Cambridge Overseas School Certificate) levels and 'communication support' in the form of visual aids, pamphlets, training for field workers, instructional booklets and radio programs. The LDTC has undertaken surveys in radio use, newspaper distribution, literacy levels, and effective demand for basic knowledge and literacy/numeracy programs.

LDTC services are made available to other ministries and non-governmental organisations. It has also provided support services and educational materials for the in-service training of unqualified teachers at the National Teacher Training College. Teachers enroled in Lesotho's In-Service Education for Teachers Certificate Program (LIET) are automatically enroled in the correspondence institute.

There is provision in the schedules of Radio Lesotho for educational broadcasts, but the Ministry of Education lacks facilities and staff to make much use of the air space. Further, restricted access to electricity in rural areas, and a lack of funds for radio batteries, limits the benefit of radio broadcasts to many schools. Still, LDTC is one of the most significant educational users of the radio, with others including the Agricultural Information Service and the Health Education Unit.

Education priorities for the development plan period covering 1980-85 included expanding distance teaching to reach about 500,000 people.

The telecommunications infrastructure in Lesotho is moderately well developed for the region, and continues to grow fairly rapidly. The national network has almost all modern Ericsson digital exchanges and high priority is now given to the extension of the network into rural areas. The achievement of this goal will take several years as the telecommunications administration is only just now negotiating financial arrangements with potential donors for its rural expansion program, which will see the installation of several multi-access subscriber radio systems. The existence of digital exchanges in all of the key provincial towns provides a fairly good coverage into the country's primary population centres.

LITERACY RATES (%)	
Total	73.6
Males	62.4
Females	84.5

PERCENTAGE OF AGE GROUP ENROLED IN EDUCATION (1986)	
PRIMARY	
Total	115
Males	102
Females	127
SECONDARY	
Total	22
Males	18
Females	26
TERTIARY	
Total	

The Lesotho Distance Teaching Centre was established by the International Extension College of the Ministry of Education (MOE). Its activities include correspondence courses and providing communication support in a number of forms including use of radio programs.

There is provision in the schedules of Radio Lesotho for educational broadcasts, but MOE lacks facilities and staff to make much use of the air space.

Lesotho is one of the least well equipped countries for radio broadcasting. Only Tanzania has fewer receivers per 100 people than Lesotho. Yet Lesotho

DIRECT EXCHANGE LINES	
Capacity	15,080
DELs in use	11,460
Per 100	0.67
Residential	25%
Automatic	99%
Wait list	5,330
Demand	16,790
TELEPHONE SETS	
Number	19,160
Per 100	1.13
Urban	94%

ranks high with respect to the number of hours broadcasting provided each day.

There is no television broadcasting service in Lesotho, though a number of people in the country have television receivers and can receive South African broadcasts. The government considers the introduction of television desirable partly as an educational medium with higher prospects for producing better results than radio. Due to the high individual costs of television sets, it has been suggested that the government introduce community viewing under an organised village system, however this has yet to make any real progress.

FACSIMILE (Telefax)	120
LEASED CIRCUITS	30
TELEX SUBSCRIBER LINES	290

The Lesotho National Broadcasting Service (LNBS), or Radio Lesotho, is the responsibility of the Broadcasting Department of the Ministry of Information and Broadcasting. Broadening the scope of educational programming for schools and adult education projects form part of Radio Lesotho's policy priorities.

LNBS facilities include new studios and an office complex to house the Department of Broadcasting and the Department of Information. Also, there is a fully equipped outside broadcast vehicle available to conduct live broadcasting from remote locations. There are plans to establish regional studios to facilitate transmissions of news and programs from remote areas. To date, approximately 95% of the programs broadcast by Radio Lesotho are locally produced. Operation of Radio Lesotho is centralised in Basotho.

Basic level technical telecommunications training is available in Lesotho at the staff training centre located in Maseru. Lesotho's staff training centre has been equipped with eight computers with advanced computer aided training software providing interactive instruction in modern analog and

RADIO BROADCASTING	
Receivers	
Number	150,000
Per 100	13.27
Rank	6th
Transmitters	
MF	1
HF	1
VHF	8
Total	10
Ownership	Gov't
Channels	1
Daily Hours	17
Rank	4th
Coverage	
Population	70%
Area	80%
TELEVISION BROADCASTING	
Receivers	
Number	8,000
Per 100	0.71
Transmitters	None

digital circuits and systems. This software allows trainees to manipulate circuit values and view the result of these changes. The staff at the centre provides entry level training for all new Lesotho Telecommunications Corporation (LTC) technicians and coordinate all corporate training programs.

Intermediate and advanced level telecommunications training is provided through the Multi Country Training Centre in Malawi. Lesotho is one of the four main participating countries in the operation of this training centre. Some trainees are also sent to specialist courses in the UK or Sweden. Advanced trainees may also attend the Central Training School in Nairobi, Kenya.

TELECOMMUNICATIONS TRAINING

Basic level technical training is available at the LTC staff training centre. This centre boasts having specialised computer based training facilities.

Lesotho's technicians receive intermediate level training at the Multi Country Training Centre (MCTC), operated jointly with Malawi, Botswana and Swaziland. Specialist courses in the UK and Sweden are also provided at this level.

Advanced training is available from the Commonwealth Training School in Kenya.

EXISTING TELECOMMUNICATIONS NETWORK

MALAWI

Given its relatively small land area, Malawi's population density is high. Although only one other African Commonwealth country is less urbanised than Malawi, the country's high urbanisation growth rate may change this over time.

POPULATION	7.9 million
POPULATION GROWTH RATE	3.5%
AREA	118,000 sq km
POPULATION DENSITY	66.9 peo/sq km
URBANISATION	13%
URBANISATION GROWTH RATE	8.6%

Malawi has had a moderately healthy economy as of late, although it was somewhat sluggish during the early 1980s. Malawi's GDP per capita is almost the lowest for the group.

Malawi is more dependent on agricultural production than most of the countries in the study group. The country has few natural resources. Over a third of GDP accrues to agriculture. In industry and services, Malawi ranks about middle.

Malawi's budget expenditures on education and telecommunications are on the low side.

The adult literacy rate in Malawi is relatively low. Further, Malawi has the second lowest primary school enrolment rate. The same is true at the secondary level. From the available data, it appears that enrolment at the tertiary level lags behind most of the other countries as well. There is no compulsory enrolment at any level in Malawi.

GDP (millions US$)	1110
GDP per capita	141
GDP Growth Rate (1980-87)	2.6%
GDP Growth Rate (1987-89)	4.1%
Distribution of GDP	
Agriculture	37%
Industry (Manufacturing)	18%
Services etc.	45%
Portion of budget spent on	
Education	3.8%
Telecoms	1.2%

Correspondence education is available in Malawi, provided mainly by the Malawi Correspondence College and Broadcasting Unit, which is run and financed by the Ministry of Education. Other correspondence colleges, including some from abroad, also provide courses.

The Malawi Correspondence College merged with the Schools Broadcasting Unit in 1973 after coexisting for six years. The objectives of the College and Broadcasting Unit are:

- to provide opportunities for secondary school education to the thousands of primary school leavers who are unable to attend secondary schools;
- to enable adults who did not complete their education to have formal education at primary or secondary level;
- to enable primary school teachers to upgrade themselves; and
- to ensure that adequate alternative education opportunities are available and to prevent a drain of funds to foreign correspondence colleges.

The Broadcasting Unit supplements the courses offered by the Correspondence College by providing radio programs and a tape service whereby schools send blank tapes to the Unit on which it records specially requested materials.

With the cooperation of the Malawi Broadcasting Corporation, the Malawi Correspondence College and Broadcasting Unit offers the following courses:

- a primary school certificate course
- nine Junior certificate courses
- seven Malawi Certificate of Education courses
- in-service teacher upgrading courses.

There are also a few 'general interest' programs.

LITERACY RATES (%)	
Total	41.2
PERCENTAGE OF AGE GROUP ENROLED IN EDUCATION (1986)	
PRIMARY	
Total	64
Males	72
Females	55
SECONDARY	
Total	4
Males	6
Females	3
TERTIARY	
Total	0.6
Males	0.9
Females	0.3

Correspondence courses are offered mainly through the Malawi Correspondence College and Broadcasting Unit. Other correspondence colleges, including some from abroad, also provide courses.

The Broadcasting Unit supplements courses offered by the Correspondence College with radio programs and a tape service.

Broadcasting is carried out mainly between 9:00 and 12:00 a.m. on weekdays. Primary schools and correspondence college centres have been supplied with radios from various donors, through the Ministry of Education, while in the secondary schools, a tape recording service, also operated by the Broadcasting Unit, is more common. Most of the material at primary and secondary levels tends to be of the direct teaching support kind, closely linked to the syllabi.

Malawi Correspondence College and Broadcasting Unit's close connection with the formal education system is shown by the type of courses it offers. The

annual enrolment figure is approximately 3,500 dividing into the following percentages:

Junior Certificate of Education	78.5
Teacher Upgrading courses	5.5
London GCE/Malawi Cert. of Educ.	12.5
Primary School Leaving Certificate refresher course	3.5

There are also some 70 correspondence college centres and night schools which give 2 to 4.5 hours' direct teaching a day, supplemented by a daily 45 minute broadcast put out by the Schools Broadcasting Unit. These centres started as study groups which met under the guidance of teachers. They have developed into schools with their own or shared facilities and a permanent staff of one teacher per 40 pupils. The local community usually provides the classrooms, hostels, and teachers' accommodation while the college provides teachers and materials, including a radio. A survey conducted in 1976 showed that primary schools were the best and most consistent users of the broadcasts.

DIRECT EXCHANGE LINES	
Capacity	32,570
DELs in use	23,600
Per 100	0.30
Residential	46%
Automatic	96%
Wait list	5,590
Demand	29,190
TELEPHONE SETS	
Number	50,000
Per 100	0.63
Urban	74%

The telecommunications infrastructure in Malawi has a low penetration rate relative to the other African Commonwealth countries. Only three other Commonwealth countries have fewer DELs per 100 (Tanzania, Nigeria and Uganda), and fewer telephones per 100 (Tanzania, Sierra Leone, and Uganda). However, despite the low penetration, the public telecommunications sector is reasonably well organised and the network is relatively modern and extends good quality service into rural areas.

The operating administration, the Malawi Post Office (MPO), has a 20 year Master Plan, prepared under the auspices of the ITU, covering the period 1983-2002. This has provided a sound basis for network development in the country. The country's main transmission backbone comprises advanced microwave systems with a diversity of routing possibilities. Quality of service is generally quite good. The MPO has a well planned rural expansion policy, resulting from the Master Plan, to bring telephone service to within 12 kilometres of all rural population centres by the year 2000. This objective is feasible because of Malawi's relatively high population density. A number of French and British funded rural automation projects, which include the installation of more than thirty small digital exchanges

FACSIMILE	
Bureaufax	0
Telefax	150
DATA TERMINALS	37
LEASED CIRCUITS	0
TELEX SUBSCRIBER LINES	592

plus subscriber radio systems, have been completed over the last three years. Others are either in an advanced stage of completion or being planned.

A constraint to more rapid expansion of the network in Malawi is a shortage of trained manpower, particularly in the local line plant area. This is being addressed by the MPO through the expansion of its training college (see later), but assistance is required in the form of expertise and equipment.

RADIO BROADCASTING	
Receivers	
Number	1,500,000
Per 100	18.96
Rank	2nd
Transmitters	
MF	9
HF	2
VHF	0
Total	11
Ownership	Public
Channels	1
Daily Hours	21
Rank	1st
Coverage	
Population	60%
Area	50%
TELEVISION BROADCASTING	
Receivers	
Number	5,000
Per 100	0.06
Transmitters	None

Malawi is relatively well equipped in radio broadcasting, surpassed only by Sierra Leone in the number of receivers per 100 people, however population and area coverage are relatively low (only two other countries are worse off in these respects). The number of daily broadcast hours provided by Malawi's single broadcast service is the greatest for all the countries of the group under study.

There is no television service in Malawi and little opportunity for receiving broadcasts from neighbouring countries. In consequence, a comparison of the number of receivers per 100 people ranks Malawi at the bottom of the group.

The main telecommunications training facility in Malawi is the Multi-Country Training Centre (MCTC). It was established in 1976 as a joint training facility for Malawi, Botswana, Lesotho, and Swaziland, but participation in the centre is open to all SADCC member states and members of the OAU. It was initially assisted by the ITU and UNDP. Expansion of the MCTC is required in order to increase the facilities available to Malawi for basic level training courses. Since 1975, the MCTC has accommodated both the Malawi National Training Centre, which provides basic level training courses for Malawians, and a Regional Training Centre which provides intermediate level courses for Botswana, Lesotho, Swaziland, and Malawi.

The staff of around 15 instructors plus support staff at MCTC conduct about 50 different courses, ranging from one to ten weeks in length. Hostel style accommodation is available for nearly 100 students. Training laboratories are equipped with a variety of manual switchboards, switching and transmission equipment. During the period September 1988 to August 1989, almost 500 trainees participated in the various courses offered. Malawi's training needs, however, especially at the lower grades, have not been entirely met; this is, in part, due to space constraints at the MCTC. Courses not held at

MCTC have been held at the Polytechnic so that the quota of required trainees can be met. The opening of a new National Training School facility, situated a few hundred metres from MCTC, in 1991 will help to alleviate this problem. However, it is understood that MPO still needs technical support from outside to reach its training potential.

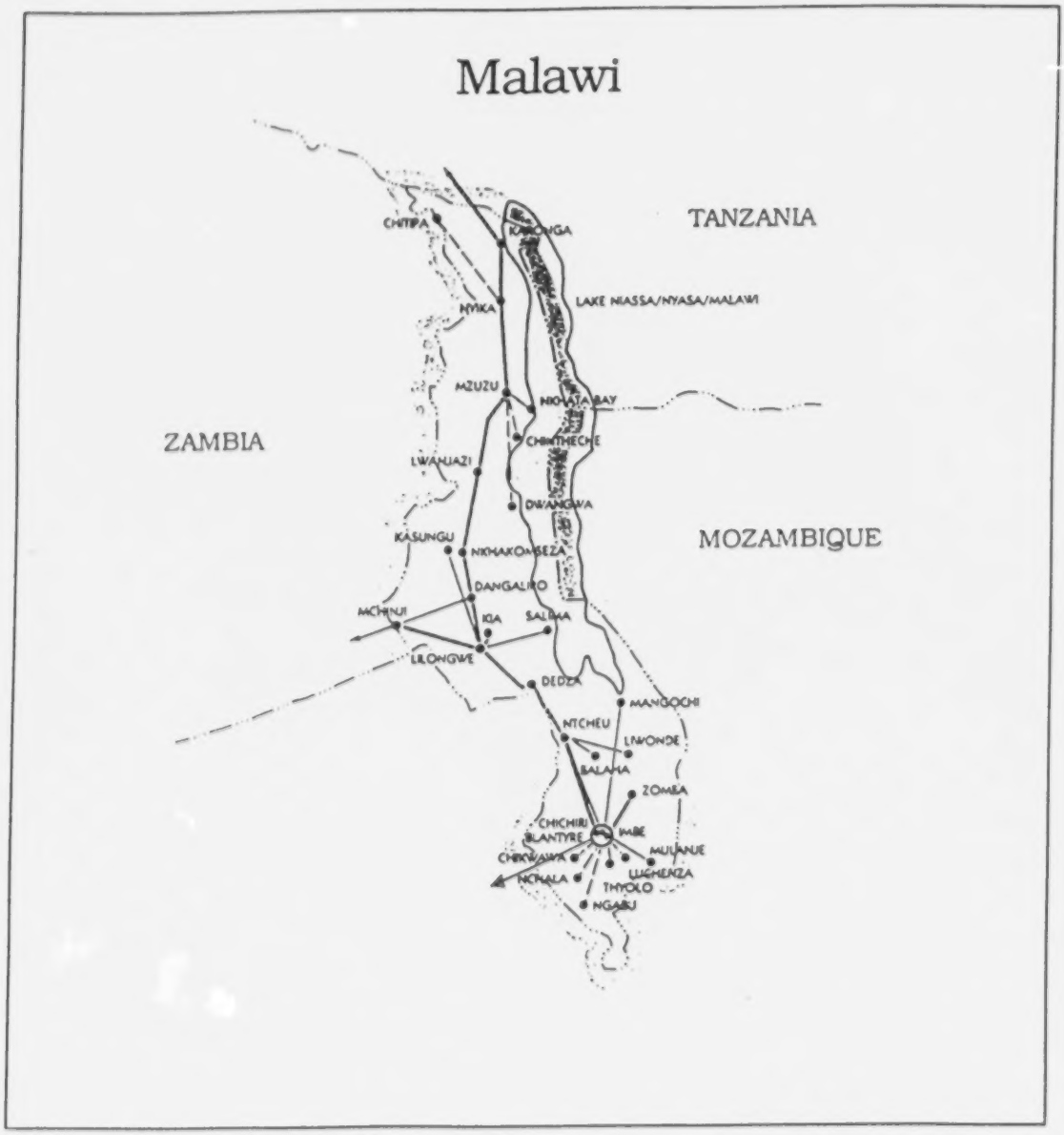
The MPO has also had the benefit of courses conducted by ITU Training Experts. These are directed particularly towards staff technological advancement or to prepare them for more advanced training at manufacturers' institutions abroad. The training conducted abroad, through the sponsorship of other training funding organisations, has contributed significantly to MPO manpower development. Training abroad is being used particularly to increase competence in the area of digital technologies.

TELECOMMUNICATIONS TRAINING

The Ministry of Transport and Communications trains post and telecommunications specialists. However, the main training facility in Malawi is the Multi-Country Training Centre (MCTC), a training facility jointly run by Malawi, Botswana, Lesotho, and Swaziland. The Malawi Post Office (MPO) uses a number of training options besides these two.

Telecommunications technician training os also available at the Malawi Polytechnic. The main role of the polytechnic in technical training is in the training of technicians, diploma engineers, and graduate engineers.

The Polytechnic offers training for technicians, diploma engineers, and graduate engineers. The engineering diploma course at the Polytechnic is actually a three year university course followed at the polytechnic, offering a more academic emphasis than the technicians' course. The engineering degree course is a six year program aimed at producing high level professional engineers.



EXISTING TELECOMMUNICATIONS NETWORK

NIGERIA

Nigeria's land area is almost the largest of the countries being studied, but this is matched by a large population thus making Nigeria the most densely populated country of the group. The level of urbanisation is also among the highest.

POPULATION	106,600,000
POPULATION GROWTH RATE	3.0%
AREA	924,000 sq km
POPULATION DENSITY	115.4 p/sq km
URBANISATION	33%
URBANISATION GROWTH RATE	6.3%

The Nigerian economy looks bleak, with GDP growth the worst for the region. The country suffered a severe blow with the drop in oil fortunes, followed by sharp austerity measures imposed by the government. Nigeria's dependence on oil is reflected in its distribution of GDP: the most active sector in Nigeria is the industrial sector, which ranks among the highest for the countries under study next to Botswana and Zimbabwe. This sector, however, is not as highly diversified as desired.

GDP (millions US$)	24390
GDP per capita	229
GDP Growth Rate (1980-87)	-1.7%
GDP Growth Rate (1987-89)	
Distribution of GDP	
Agriculture	30%
Industry	43%
(Manufacturing)	(8%)
Services etc.	27%
Portion of budget spent on	
Education	0.8%
Telecoms	0.3%

Nigeria's expenditures in the areas of education and telecommunications are dismal, likely the direct result of the government's austerity measures. The country has the lowest level of spending in both these areas of all the countries currently being studied.

Given its large population and the low level of spending dedicated to education, it is not surprising that Nigeria sits close to the bottom in terms of its level of adult literacy. Enrolment statistics are somewhat more positive, with enrolment at the primary level over 90% placing Nigeria within the middle of the group. However, national primary enrolment rates mask regional imbalances. The northern states still lag behind those in the south in educational attainment. Each state operates under its own education law, exacerbating attempts at introducing uniformity in the structure of administration and control of education throughout the country. Compulsory schooling is said to exist for the 6 to 12 years age group in Nigeria.

Nonformal educational opportunities in Nigeria include correspondence courses. A number of Universities and Institutions offer distance education programs. There is a Correspondence and Open Studies Unit operating as a department of the University of Lagos. For some years, the University of Ife organised evening degree courses following a format similar to that of the UK's Open University system. It is unclear if this is still in place. Further, the National Teachers Institute (NTI) at Kaduna has offered a distance learning program. There are other correspondence colleges, some local and others from overseas, with branches throughout Nigeria.

The Federal Radio Corporation of Nigeria (FRCN) provides broadcast services from four linguistic zones with zonal broadcasting centres in Enugu, Kaduna, Ibadan and Lagos. The latter has the responsibility of broadcasting national programs in English as well as the educational service. Nigeria has a three tier radio broadcasting system: the network news service operating from Lagos, broadcasting from the zonal centres, and the service from state run stations which provide "grassroots broadcasting".

LITERACY RATES (%)	
Total	42.4
Males	53.8
Females	31.5
PERCENTAGE OF AGE GROUP ENROLED IN EDUCATION (1986)	
PRIMARY	
Total	92
Males	103
Females	81
SECONDARY	
Total	29
Males	
Females	
TERTIARY	
Total	

Correspondence education and open learning has been provided through the University of Lagos and the University of Ife. Local and overseas correspondence colleges also operate in Nigeria.

Both radio and television has been used for educational purposes in the country.

The Nigerian Television Authority (NTA) has the legislative authority over the nineteen stations which make up the Nigerian television network. Each of the nineteen state capitals has its own production centre. Also, there are a minimum of three production centres per zone, there being six television broadcasting zonal areas identified in the country. Programs developed in the various zones are broadcast nationally through facilities that are owned and operated by the Department of Posts and Telecommunications.

Nigeria's television broadcasting infrastructure was developed on the pretext of being valuable for education, and educational television broadcasting in Nigeria dates back to 1959. NTA policy explicitly stated the need to "organise, provide and subsidize for the purpose of broadcasting, educational activities and public entertainment." Educational television broadcasts were the joint responsibility of the Ministry of Education and the television station of each region which would broadcast them. The

broadcasts were based on the syllabi of schools of the region concerned. Each region had its own Ministry of Education making national educational television unfeasible. The expected educational returns from television broadcasting have never fully materialised in Nigeria but some significant achievements have been made and television broadcasting to schools continues. The National Educational Technology Centre still produces educational television broadcasts for schools.

DIRECT EXCHANGE LINES	
Capacity	365,630
DELs in use	235,530
Per 100	0.21
Residential	55%
Automatic	100%
Wait list	290,550
Demand	526,080
TELEPHONE SETS	
Number	722,070
Per 100	0.66
Urban	89%
TELEX SUBSCR. LINES	5983

Nigeria has the fewest number of DELs per 100 population of any of the African Commonwealth countries except Uganda. However, NITEL is in the midst of rehabilitating its system. Some plans include replacing and repairing existing facilities, including a satellite earth station at Lanlate, installing new exchanges and accompanying line plant in major cities, and expanding long distance transmission links.

The network has seen significant growth over the past few years, with the number of installed lines increasing by about 25% over 1987-89. Development plans for telecommunications are aimed towards having a network containing one million lines, with a density of 1 line per 100 population, in the near future. The main development in Nigerian telecommunications at this

In early 1985, Nigeria's Ministry of Communications and its agencies reorganised, leading to the formation of NITEL (Nigerian Telecommunications Ltd.), the operating company responsible for supplying Nigeria's telecommunications services. The federal government is the majority shareholder in NITEL, which is operated as a limited liability company. It is autonomous and considered a commercial organisation.

RADIO BROADCASTING	
Receivers	
Number	16,600,000
Per 100	15.57
Rank	3rd
Transmitters	
MF	20
HF	16
VHF	3
Total	39
Ownership	Public
Channels	2
Daily Hours	19
Rank	2nd
Coverage	
Population	100%
Area	100%
TELEVISION BROADCASTING	
Receivers	
Number	600,000
Per 100	0.56
Transmitters	62
Ownership	Gov't
Channels	2
Daily hours	9
Coverage	
Population	80%
Area	75%

time is the digitalisation of the network. This development is taking place in three phases: phase 1, slated to take place between 1987 and 1991, will see the digitalisation of secondary exchange centres and their interconnecting transmission links; phase 2, running between 1992 and 1994, should result in the digitalisation of the primary centres and the transmission links between all digital exchanges; phase 3, from 1995 to 2000, would provide digitalisation of all the local networks and exchanges.

In an agreement with the Turkish PTT, NITEL will receive a transfer of technology for digital rural switching, PCM and microwave. A plant is being set up by NITEL to annually produce 100 digital rural exchanges with a capacity of 50,000 lines, and PCM and microwave equipment for 12,000 channels. The agreement will take place in three phases extending over five years. The plant currently manufactures spare parts and telephone sets.

TELECOMMUNICATIONS TRAINING

A telecommunications technical training centre is being constructed and equipped in Lagos by the company, Siemens.

There is a domestic satellite service with 20 earth stations in Nigeria.

Nigeria is well equipped with both radio and television broadcasting facilities and networks. It is one of only two countries (the other being Swaziland) which boasts having 100% radio broadcast coverage, in terms of both population and area. Television coverage, although not 100% of population and area, is the highest for the region.

A modern and well equipped telecommunications technical training centre is being constructed and equipped in Lagos by the company Siemens.

Nigeria has an Institute of Mass Communication at the University of Lagos which provides training to those involved in the broadcasting industry. An interesting feature of the rapid growth of television broadcasting in Nigeria was the concomitant rapid growth in the number of both trained and untrained personnel for the industry. The federal and state governments recruited a large number of staff who were sent to the UK, USA and other developed countries for professional television training. The result was the ability of television personnel to increase remarkably the number of locally made television programs. NTA's policy includes the following goal: "acquire public printed matter that may be conducive to advancing skills of persons employed in the broadcasting services, or the efficiency of the equipment used in the broadcasting services or the manner

BROADCAST TRAINING

Nigeria has an institute of Mass Communications at the University of Lagos. A large complement of training technicians exists in the television sector resulting from professional training received in the UK, USA and other developed countries.

in which that equipment is operated, including the providing of the Authority or the others on its behalf of facilities for training, education and research."

SIERRA LEONE

Sierra Leone is demographically more stable than most of the other countries studied, having relatively low population and urbanisation growth rates.

POPULATION	3,800,000
POPULATION GROWTH RATE	2.6%
AREA	72,000 sq km
POPULATION DENSITY	52.8 p/sq km
URBANISATION	26%
URBANISATION GROWTH RATE	5.0%

Economically, its GDP per capita is relatively high, and is growing at about an average rate for the region. Sierra Leone continues to be quite dependent on the agricultural sector, although mining, especially iron ore and diamonds, are important. Only two other countries have a larger portion of GDP accruing to agriculture.

GDP (millions US$)	1570
GDP per capita	413
GDP Growth Rate (1980-87)	0.7%
GDP Growth Rate (1987-89)	
Distribution of GDP	
Agriculture	45%
Industry	19%
(Manufacturing)	(4%)
Services etc.	36%
Portion of budget spent on	
Education	1.7%
Telecoms	0.3%

Sierra Leone's expenditures on education are amongst the lowest for the region, surpassing only one other country, Nigeria. Sierra Leone's expenditures on telecommunications are also very low: Nigeria and Sierra Leone dedicate the smallest proportion of their budgets to telecommunications of all the countries under study.

Sierra Leone does not compare favourably in the area of adult literacy either: the country has the lowest rate among all African Commonwealth states and it is currently declining. Primary school enrolment rates are also the lowest in Sierra Leone, although the country compares slightly more positively in terms of secondary school enrolment levels. Enrolment is not compulsory in Sierra Leone.

Broadcasting has been used in Sierra Leone for educational purposes. In 1981, the country broadcast educational programs for 10 hours per week.

The country's telecommunications infrastructure is in a generally poor state and the vast majority of existing subscribers (87%) are in the capital, Freetown. The European Commission has financed a major program of technical assistance and rehabilitation since 1987. This has included the installation of new digital exchanges in Freetown, the refurbishment of existing electro-mechanical exchanges in the nine key provincial towns, and the rehabilitation of the trunk transmission systems. The most pressing problem has been the

generally very poor state of the local network cabling. Although some rehabilitation has taken place, it will take a few years before the network can be considered fully operational in the provincial centres at least. Even then, the geographical coverage of the network will be limited. Large parts of the country are unserved and service in all the rural areas of the country is virtually non-existent.

Responsibility for telecommunications is divided between two organisations. the Sierra Leone National Telecommunications Company (SLNTC), which is wholly government owned, is responsible for domestic services. Sierra Leone External Telecommunications (SLET) provides international services and is 51% owned by the government, 49% by Cable and Wireless of the UK. SLET operates the main international gateway exchange and an Intelsat earth station and is relatively well run. Under a recent EC funded study, it has been recommended that SLNTC and SLET should be amalgamated. This would result in greater efficiency and more balanced telecommunications development in the country.

LITERACY RATES (%)	
Total	23.6
Males	31.2
Females	16.5
PERCENTAGE OF AGE GROUP ENROLED IN EDUCATION (1986)	
PRIMARY	
Total	54
Males	64
Females	44
SECONDARY	
Total	17
Males	23
Females	11
TERTIARY	
Total	1.3
Males	1.9
Females	0.7

Radio broadcasting has been used for educational purposes in Sierra Leone.

In contrast to the situation with the telecommunications network, Sierra Leone is favourably placed with respect to its radio broadcasting facilities. The country has the highest number of radio receivers per 100 people of the group. Coverage, however, and the number of hours that there is broadcasting, fairs only about average.

DIRECT EXCHANGE LINES	
Capacity	15,650
DELs in use	15,500
Per 100	0.40
Residential	61%
Automatic	99%
Wait list	3,140
Demand	18,640
TELEPHONE SETS	
Number	14,900
Per 100	0.38

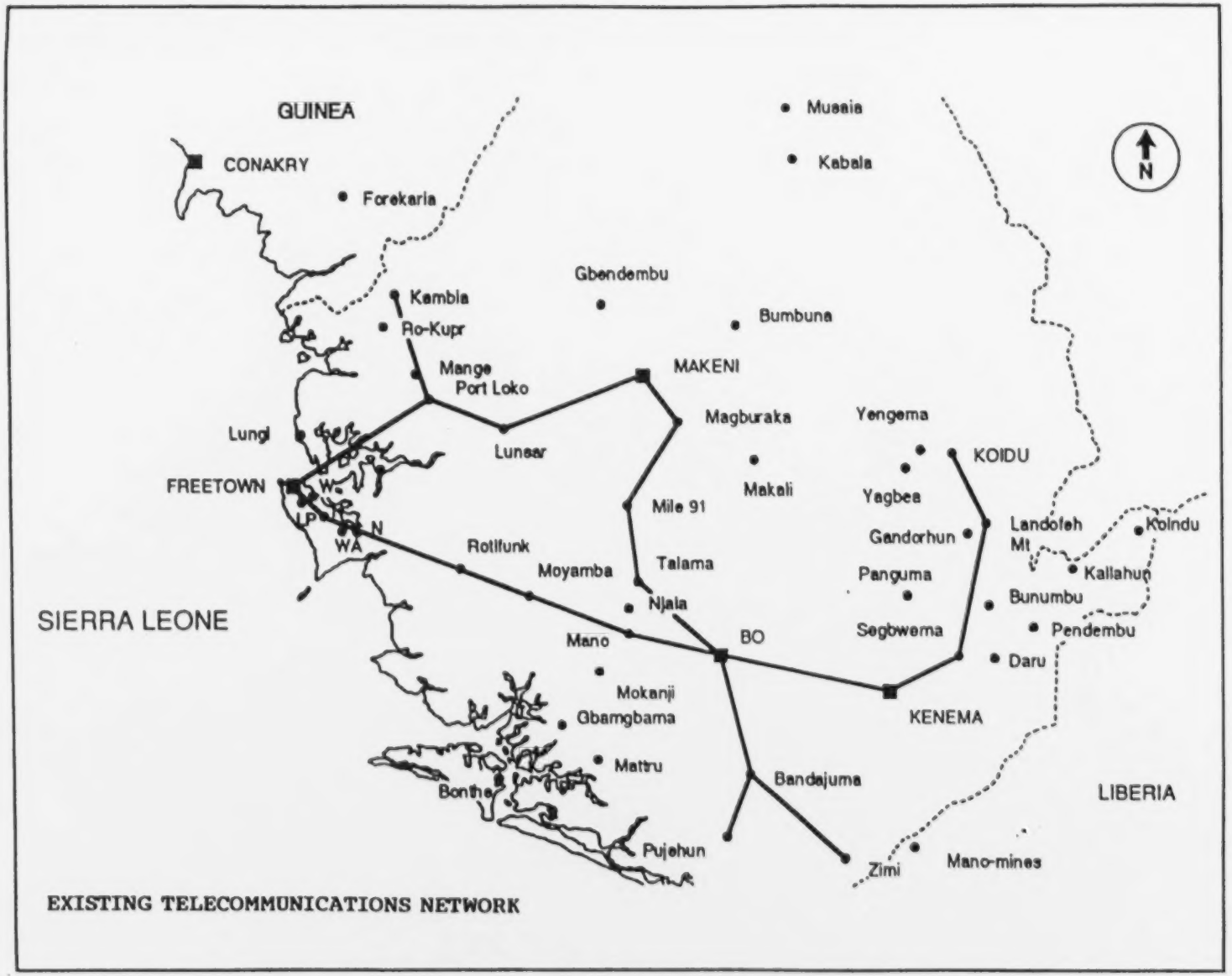
Sierra Leone also has television services. The country has a reasonably high number of receivers per 100 people, but population and area coverage are not at particularly high levels. Sierra Leone Broadcasting Service (SLBS), which incorporates both radio and television services, is a government department forming part of the Ministry of Information and Broadcasting, and is financed by government subsidy.

In 1981, it was reported that Sierra Leone had only 75% of its required staff strength in broadcasting.

Telecommunications training in the country has been close to non-existent over the past few years. SLNTC and SLET do not have good facilities and one effort to set up an external training college which would have included telecommunications, in cooperation with neighbouring countries, has fallen apart. SLNTC, in particular, is greatly in need of human resource development in every department (including areas such as management, finance, customer service, and operation and maintenance). With the proposed amalgamation of SLNTC and SLET, some of the existing staffing shortages may be alleviated, and the international resources of Cable and Wireless could be brought to bear on the problem. However, major assistance from elsewhere will probably be required since the extent of C&W's involvement, or of continuing EC support, is not clear at this stage. Certainly, the amalgamation will be accompanied by an integrated human resource development program and there exists a potential opportunity for outside assistance.

FACSIMILE (Bureaufax)	6
DATA TERMINALS	
LEASED CIRCUITS	325
TELEX SUBSCRIBER LINES	310

RADIO BROADCASTING	
Receivers	
Number	830,000
Per 100	21.61
Rank	1st
Transmitters	
MF	1
HF	1
VHF	
Total	2
Ownership	Gov't
Channels	1
Daily Hours	13
Rank	6th
Coverage	
Population	55%
Area	50%
TELEVISION BROADCASTING	
Receivers	
Number	33,000
Per 100	0.86
Transmitters	2
Ownership	Gov't
Channels	1
Daily hours	6
Coverage	
Population	20%
Area	40%



EXISTING TELECOMMUNICATIONS NETWORK

SWAZILAND

Swaziland has the smallest population in absolute numbers of the country's being studied, but in other demographic terms (eg. population density or growth rate), Swaziland is about average for the group.

POPULATION	710,000
POPULATION GROWTH RATE	3.4%
AREA	17,000 sq km
POPULATION DENSITY	41.9 peo/sq km
URBANISATION	26%

Next to Botswana, Swaziland has the healthiest GDP per capita for the group. Swaziland also has the advantage of having a fairly well diversified economy. GDP growth has been strong, substantially improving over the past few years. Over the 1987-89 period, GDP growth in Swaziland matched Botswana, which saw a decline. Further growth is expected, due primarily to expansion in the manufacturing sector. The country's success in attracting foreign investment and the development of a relatively well diversified economy augur well for the future.

Government expenditures on education and telecommunications are fairly positive in Swaziland. Within the group, Swaziland ranks among the top spenders in these categories. Only Botswana surpasses Swaziland in the proportion of budget spent on telecommunications developments.

GDP (millions US$)	612
GDP per capita	860
GDP Growth Rate (1980-87)	4.7%
GDP Growth Rate (1987-89)	8.5%
Distribution of GDP	
Agriculture	25%
Industry	30%
(Manufacturing)	(23%)
Services etc.	45%
Portion of budget spent on	
Education	5.3%
Telecoms	5.1%

Although Swaziland has only about an average level of adult literacy, it would appear that efforts are being made to improve this situation. Swaziland ranks within the top three countries for percentage of enrolment at the primary, secondary and tertiary levels of education. The country has the highest rate of enrolment at the tertiary level, tied with Zimbabwe. Enrolment is not compulsory in Swaziland at any level.

Nonformal education in Swaziland includes an intensive program of correspondence courses leading to the junior certificate examination. Enrolment numbers over 1500 individuals per year. About 1000 of these students are over the age of 20 years. The Swaziland International Education Centre (SIEC) supervises this program.

Educational radio broadcasting was initially started as an experiment by the Ministry of Education in 1967. By 1968, educational broadcasting was available on air for 9 hours per week. Today, the Swaziland Broadcasting Service (SBS) allots about 18 hours weekly for educational broadcasting. During school terms, one third of all week day programs are directed to school use.

Private commercial interests initially owned the Swaziland television service, Swaziland Television Broadcasting Corporation (STBC), but the government bought it in 1982. The Ministry of Education, aided by UNESCO, has conducted training courses in the production of educational television programs. A special studio was built for educational television program production and broadcasting. Some schools have received television sets donated by a commercial company, and plans have been made to extend transmission throughout the nation.

LITERACY RATES (%)	
Total	67.0
Males	69.0
Females	65.0
PERCENTAGE OF AGE GROUP ENROLED IN EDUCATION (1986)	
PRIMARY	
Total	105
Males	106
Females	104
SECONDARY	
Total	42
Males	42
Females	41
TERTIARY	
Total	3.7
Males	4.4
Females	3.1

The Swaziland International Education Centre (SIEC) supervises an intensive program of correspondence courses.

Swaziland has a relatively well developed telecommunications infrastructure. It has the highest number of DELs per 100 population of all countries of the group. Strong growth has been indicated for the network. The officially published service quality figure is quite poor, with almost three faults per line per year. However, Swaziland is not believed to be worse than other countries of the region, where figures may, in fact, not be recording the actual situation. The network is 100% analogue, but Swaziland's Posts and Telecommunications Corporation (PTC) has prepared a long term development plan to the year 2010 which specifies that all future switching and transmission investments are to be digital. The plan foresees further expansion of exchange, junction and trunk capacity, beyond those currently under way, within the next five years. Discussions are under way concerning the development of several

DIRECT EXCHANGE LINES	
Capacity	16,300
DELs in use	10,530
Per 100	1.43
Residential	47%
Automatic	98%
Wait list	2,560
Demand	13,090
TELEPHONE SETS	
Number	22,420
Per 100	3.05
Urban	81%
Quality of Service	282%

rural exchange areas using multi-access radio systems over the next five years.

Swaziland is also one of the more well equipped countries for radio broadcasting. The density of receivers per 100 people is fairly high as is the number of daily broadcast hours. Swaziland and Nigeria are the only two countries under study which have 100% coverage both in terms of population and area.

DATA TERMINALS	63
LEASED CIRCUITS	289
TELEX SUBSCRIBER LINES	740

Swaziland also has a fairly well established television broadcasting infrastructure. Area coverage is quite high, but coverage by population is relatively low.

RADIO BROADCASTING	
Receivers	
Number	105,000
Per 100	14.79
Rank	4th
Transmitters	
MF	3
HF	
VHF	6
Total	9
Ownership	Govt/Com
Channels	2
Daily Hours	18
Rank	3rd
Coverage	
Population	100%
Area	100%
TELEVISION BROADCASTING	
Receivers	
Number	9,000
Per 100	1.27
Transmitters	9
Ownership	Govt
Channels	1
Daily hours	6
Coverage	
Population	40%
Area	70%

The Swaziland Posts and Telecommunications Training Centre is located at the Swaziland College of Technology campus in Mbabane. A newly completed building provides three additional classroom/laboratories, a postal training area and office space for instructional staff. There are three full time instructors, supplemented by specialists from PTC operations. In addition to a number of specific telecommunications courses, academic and technical courses are offered in cooperation with the College.

Canada is the main source of funds for the operation of the Institute of Development Management in Swaziland. This Institute concentrates on organising courses for middle and senior levels of management in the civil service and state run concerns. To date, the telecommunications sector has not been heavily involved.

TELECOMMUNICATIONS TRAINING

Telecommunications technical training is available at the Swaziland College of Technology.

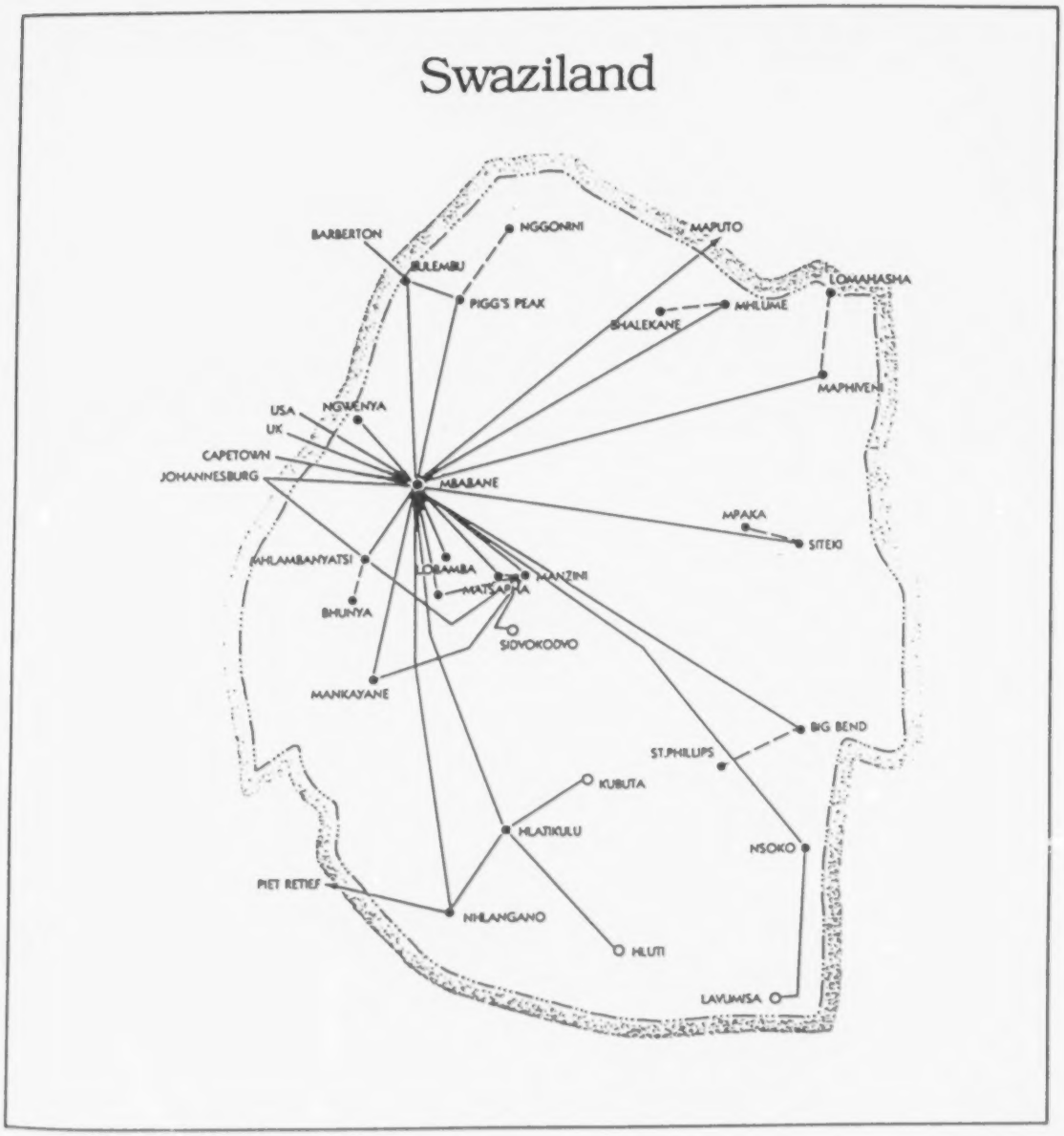
Also, Swaziland operates the Multi Country Training Centre (MCTC) jointly with Malawi, Lesotho, and Botswana.

There is no systematically executed training plan in effect for broadcast personnel in Swaziland. The Swaziland Broadcasting Service

(SBS), however, is concerned about training. SBS depends on the Department of Establishments and Training for staff development. This Department coordinates all government training policy. There is generally a shortage of skilled manpower in the broadcast sector, and turnover is quite high.

BROADCAST TRAINING

A well organised training plan is not in place for the broadcast industry in Swaziland. The Swaziland Broadcasting Service depends on the Department of Establishments and Training which coordinates all government training programs.



EXISTING TELEPHONE SWITCHING NETWORK

TANZANIA

Tanzania has one of the lowest population densities among African Commonwealth countries. However, it is also one of the more urbanised countries and has a very high urbanisation growth rate, even by African standards.

POPULATION	23,900,000
POPULATION GROWTH RATE	3.4%
AREA	945,000 sq km
POPULATION DENSITY	25.3 p/sq km
URBANISATION	29%
URBANISATION GROWTH RATE	11.3%

Tanzania's economy has not been healthy, all sectors suffering from an over centralised bureaucracy and poorly managed infrastructures. This country has the lowest GDP per capita of the group. GDP growth rate, however, is not one of the worst, and it has improved over the course of the 1980s. Tanzania continues to be rather dependent on agriculture as the recovery from a long decline in its industrial sector is not rapid. Only Uganda exceeds Tanzania in the proportion of GDP accruing to agriculture.

Tanzania's spending in the areas of education and telecommunications is not very positive. Only Nigeria allocates less of its budget to education than Tanzania and Sierra Leone, both of which spend equal proportions. Telecommunications expenditures by Tanzania are the lowest for the group, along with three other countries (Nigeria, Sierra Leone, and Uganda).

GDP (millions US$)	3080
GDP per capita	129
GDP Growth Rate (1980-87)	1.7%
GDP Growth Rate (1987-89)	2.5%
Distribution of GDP	
Agriculture	61%
Industry	8%
(Manufacturing)	(5%)
Services etc.	31%
Portion of budget spent on	
Education	1.7%
Telecoms	0.3%

Despite low levels of expenditure on education, Tanzania proves to have the highest adult literacy rate of all African Commonwealth countries. Yet, enrolment is only about average at the primary school level, and the lowest of the group at the secondary level.

Great progress was made towards improving literacy in the country when an adult education scheme was started in Mwanza followed by a universal campaign conducted with the help of Unesco. The campaign, using radio and print, aimed not only at functional literacy in Swahili but also at "consciousness raising".

Correspondence courses are available in Tanzania. Untrained teachers are urged to take correspondence courses and follow lessons broadcast over the radio. Coordination of adult education programs and administration of mass radio study and correspondence courses are the responsibility of the Institute of Adult Education.

Radio broadcasting has been used extensively in Tanzania for educational purposes. In 1981, it was reported that educational programs were being broadcast 30 hours per week. Broadcasting policy stated that broadcasts to schools were intended to help teachers give better lessons. The programs were not to be regarded as a substitute for the teachers. Fundamental adult education programs were directed mainly to give the masses basic knowledge and techniques which would enable them to participate fully in the revolutionary construction of their country.

LITERACY RATE	**85.0%**
PERCENTAGE OF AGE GROUP ENROLED IN EDUCATION (1986)	
PRIMARY	
Total	**69**
Males	**70**
Females	**69**
SECONDARY	
Total	**3**
Males	**4**
Females	**3**

Correspondence courses are offered through the Institute of Adult Education.

Schools broadcasting has been used extensively as an aid to teachers in Tanzania.

Radio Tanzania uses a system of involving listeners and outside experts in the planning and preparation of its programs. These people sit on Advisory Committees which cooperate with Radio Tanzania. Among the committees is one for broadcasts to schools and one for fundamental adult education. The Committee for schools broadcasts is comprised of members from the Institute of Education, the Institute of Adult Education, the Ministry of National Education and Radio Tanzania. At least 300 hours per year are devoted to educational programs, 200 hours for primary schools broadcasts and 100 hours for secondary schools broadcasts. In contrast to many other countries, the Ministry of National Education does not pay Radio Tanzania for such services.

Since 1981, Radio Tanzania has been decentralizing its activities, posting some program producers in the regions. The Tanzania mainland was divided into seven regional zones. So far, six zones have Zonal Officers (program producers) with offices in Songea, Mbeya, Kigoma, Mwanza, Arusha, and Dodoma. Future plans involve outfitting each zone with full Radio Tanzania production teams and program production centres.

FACSIMILE	
Bureaufax	
Telefax	**170**
DATA TERMINALS	**2**
LEASED CIRCUITS	**720**
TELEX SUBSCRIBER LINES	**1380**

DIRECT EXCHANGE LINES	
Capacity	81,210
DELs in use	66,060
Per 100	0.27
Residential	27%
Automatic	79%
Wait list	75,960
Demand	142,020
TELEPHONE SETS	
Number	130,500
Per 100	0.53
Quality of Service	40.0%

Tanzania's telecommunications infrastructure is one of the more poorly developed in the group as regards meeting the demand of the populous. Only Nigeria and Uganda have lower penetration rates. Further, Tanzania has the least number of automatic exchanges in its network and the quality of service in the Tanzania Posts and Telecommunications Corporation (TPTC) network is generally poor.

Demand for services is high and TPTC's capacity to keep pace with this demand is currently hampered by a combination of exchange traffic overload, inadequate outside plant facilities and institutional constraints. Only about 50% of the total officially registered demand is being met to date.

One of the weaknesses of the network is that several quite significant provincial towns are without automatic telephone exchanges, even though they are located on Panaftel microwave routes which criss-cross the country. Also, the international access to and from Tanzania has been inadequate and consequently congested. To meet the country's needs, TPTC has development plans which call for expenditures in excess of US$160 million over the next five years. The plans include a new Intelsat A earth station (presently under construction), a new international gateway exchange, a three phase exchange and local network modernisation project for Dar es Salaam, several new trunk microwave systems and a number of new exchanges in key provincial cities. These will form the backbone for rural telecommunications services later. The development focus will thus be primarily on the improvement of the main network for several years to come.

Tanzania is also poorly equipped with respect to broadcasting facilities. It has the lowest penetration of both radio and television receivers, and transmission facilities are unreliable.

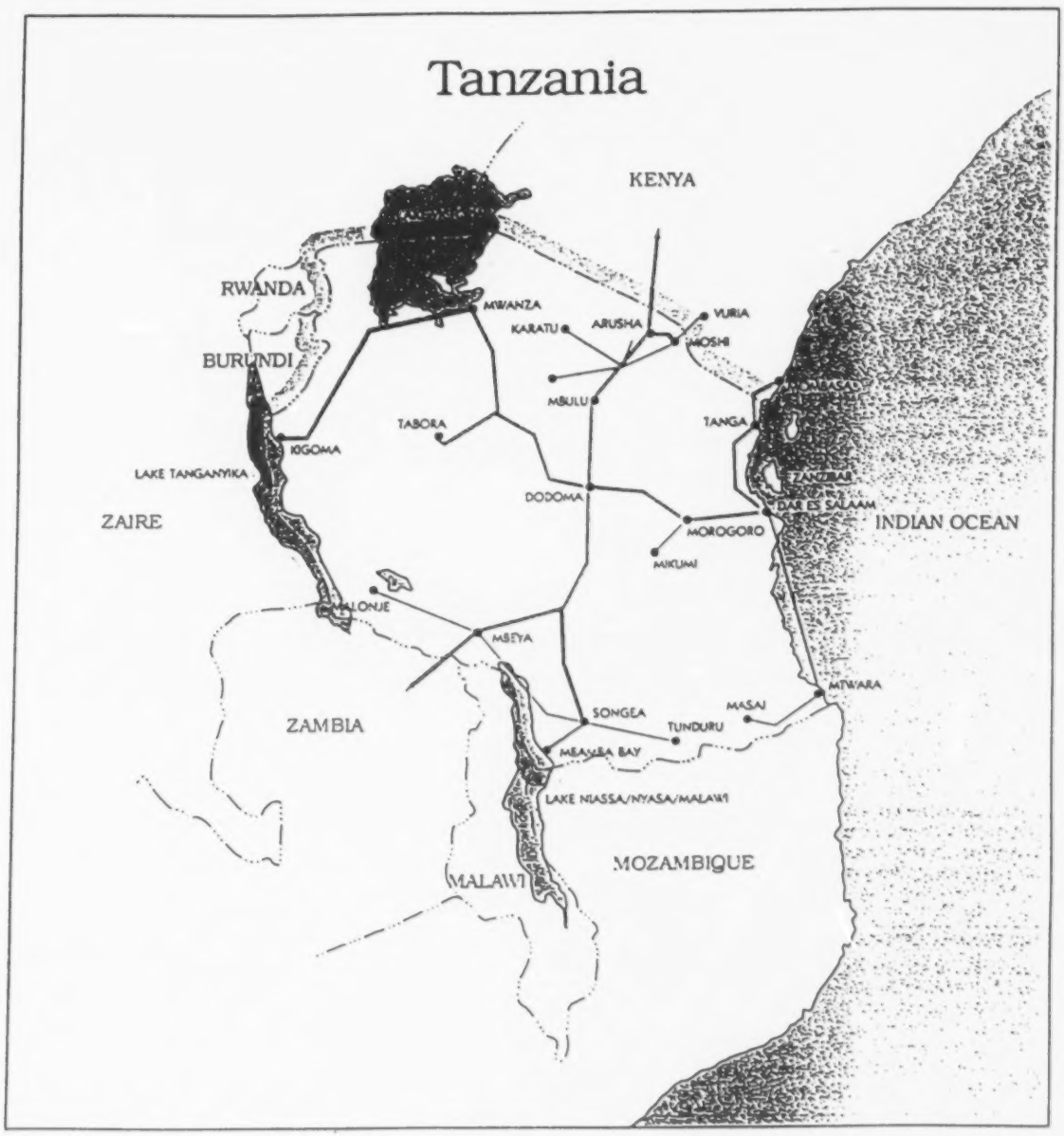
RADIO BROADCASTING	
Receivers	
Number	400,000
Per 100	1.68
Rank	12th
Transmitters	
MF	7
HF	9
VHF	
Total	16
Ownership	Gov't
Channels	3
Daily Hours	18
Rank	3rd
Coverage	
Population	70%
Area	57%
TELEVISION BROADCASTING	
Receivers	
Number	15,000
Per 100	0.06
Transmitters	2
Ownership	Gov't
Channels	1
Daily hours	5

Radio services are broadcast for a relatively high number of hours, however, and population and area coverage is about average for the region.

Telecommunications training is provided at the TPTC Training Centre in Dar es Salaam. The training centre is a self contained complex providing hostel accommodation and dining facilities for up to 240 trainees, in both Posts and Telecommunications areas. There is a staff of 60 instructors plus additional support staff.

The Technician Trainee Scheme and Technical Trainee Scheme consist of various training modules, each one to two weeks long, with practical on the job experience between modules. During the courses, trainees specialize in different areas, such as switching, transmission or external plant.

Radio Tanzania in Dar es Salaam has a training section which has some trainers from the Swedish Broadcasting Corporation of Stockholm. Concomitant in-service and formal training are used. Still, staff shortages are rather severe in Tanzania. In 1981, a study showed that Tanzania had only 45% of its staff strength. All departments are faced with a shortage of manpower, particularly the engineering, programs, and news and current affairs departments. Cooperation between Tanzanian institutions and institutions in neighbouring countries, and membership in broadcasting associations such as URTNA, BONAC and CBA, has helped to solve some training problems, by promoting personnel exchanges. In the region, exchanges are known to have taken place with the Voice of Kenya and Uganda.



EXISTING TELECOMMUNICATIONS MAIN TRANSMISSION NETWORK

UGANDA

Uganda has a high population density, but a low level of urbanisation by African standards. The urbanisation growth rate is also the lowest in the group, along with Sierra Leone.

POPULATION	15,700,000
POPULATION GROWTH RATE	3.3%
AREA	236,000 sq km
POPULATION DENSITY	66.5 p/sq km
URBANISATION	10%
URBANISATION GROWTH RATE	5.0%

Uganda is one of the poorer countries economically. Its GDP per capita and GDP growth rate are among the lowest for the area. Of all the countries under review, Uganda is the most dependent on agriculture with over three quarters of GDP accruing to this sector. Its industrial sector comprises the smallest proportion of GDP of all the African Commonwealth countries under study, having lost some ground since the 1970s. The manufacturing sector is operating at well below capacity. The economy has been experiencing an upturn, however, with increased political stability in the country.

Expenditures in the areas of education are about average for Commonwealth Africa, but were quite low for the period preceding 1987. Telecommunications expenditures in Uganda, along with Tanzania, are the lowest for the countries being studied.

GDP (millions US$)	3560
GDP per capita	227
GDP Growth Rate (1980-87)	0.4%
GDP Growth Rate (1987-89)	
Distribution of GDP	
Agriculture	76%
Industry	5%
(Manufacturing)	(5%)
Services etc.	19%
Portion of budget spent on	
Education	2.3%
Telecoms	0.3%

The adult literacy rate and primary school level enrolment in Uganda are about average for the region. Enrolment at the secondary school level is the lowest in Uganda. Enrolment is not compulsory in this country.

Uganda is committed to expanding and consolidating the education of its masses. The Centre for Continuing Education at Makerere University has grown to now offer correspondence courses as well as residential courses to those who wish to raise their academic level.

The African Adult Education Association (AAEA) was founded at Makerere University, eventually including East and Central African countries and forming the present pan African association. To advance adult education in

Africa, the AAEA promotes and serves as a clearinghouse for information on adult education programs. The AAEA is a small volunteer organisation, but sponsors biennial conferences, publishes sporadic newsletters and edits the Journal of African Adult Education.

Radio is widely used for in-service teacher training and in-service training of English language instruction in all primary grades. Teacher training is a high priority in Uganda.

Uganda has the lowest telecommunications penetration of all the countries under review. Except for Tanzania, the country also has the least number of automatic exchanges. Service quality is poor. In 1989, after protracted negotiations, Uganda secured a World Bank loan for telecommunications development. Development plans cover a four year period and include: rehabilitation of the cable networks in Kampala, Entebbe, and Jinja; the supply of handsets, telex machines, facsimile and data equipment; and the supply of a computerised subscriber record system to enable more efficient handling of accounts and faults. The World Bank project also includes the installation of up to 100 HF radio call units to provide basic communications to the remote areas of the country. It will be many years before a more extensive or higher quality rural service is possible.

LITERACY RATES (%)	
Total	57.0
Males	69.7
Females	45.3
PERCENTAGE OF AGE GROUP ENROLED IN EDUCATION (1986)	
PRIMARY	
Total	70
Males	76
Females	63
SECONDARY	
Total	13
Males	16
Females	9
TERTIARY	
Total	2.9

Correspondence courses are offered through the Centre for Continuing Education at Makerere University.

Radio is widely used for in-service teacher training and in-service training of English language instruction in all primary grades.

FACSIMILE	
Bureaufax	125
Telefax	140
DATA TERMINALS	65
LEASED CIRCUITS	380
TELEX SUBSCRIBER LINES	890

DIRECT EXCHANGE LINES	
Capacity	58,140
DELs in use	27,880
Per 100	0.17
Residential	34%
Automatic	86%
Wait list	25,350
Demand	53,230
TELEPHONE SETS	
Number	59,650
Per 100	0.37
Urban	88%
Quality of Service	210.0%

Uganda has average to low levels of facilities available in the radio and television broadcast sectors. Population coverage for radio and television is the worst in Uganda of all the countries being reviewed here.

Radio Uganda is the responsibility of the Ministry of Information and Broadcasting.

RADIO BROADCASTING	
Receivers	
Number	1,600,000
Per 100	10.21
Rank	7th
Transmitters	
MF	2
HF	7
VHF	1
Total	10
Ownership	Gov't
Channels	2
Daily Hours	17
Rank	4th
Coverage	
Population	40%
Area	57%
TELEVISION BROADCASTING	
Receivers	
Number	105,000
Per 100	0.67
Transmitters	9
Ownership	Gov't
Channels	1
Daily hours	5
Coverage	
Population	13%
Area	12%

ZAMBIA

Zambia is a fairly large country that is relatively sparsely populated. Only Botswana is less densely populated than Zambia. However, the country is also highly urbanised. Over fifty percent of Zambia's population lives in urban areas. Urbanisation continues to grow at about an average pace for the region.

POPULATION	7,200,000
POPULATION GROWTH RATE	3.5%
AREA	753,000 sq km
POPULATION DENSITY	9.6 p/sq km
URBANISATION	53%
URBANISATION GROWTH RATE	6.6%

Zambia is one of the poorest countries in the sub-Saharan area. During the 1980s, average real per capita GDP declined because of the economy's heavy dependency on mining and processing of copper, which suffered price declines. The agricultural sector was neglected in the past and performed poorly. Improved economic growth in the country in the past few years has been fuelled by a greater emphasis on agriculture and a more buoyant performance in this sector.

Spending in the education sector in Zambia is about average for the region. Telecommunications expenditures are healthy, comparatively speaking. Only Botswana and Swaziland are allocating more to this sector than Zambia.

Adult literacy rates in Zambia are about average for African Commonwealth countries. Enrolment at the primary school level is over 100%, along with Zimbabwe, Lesotho, Botswana, and Swaziland.

GDP (millions US$)	2030
GDP per capita	282
GDP Growth Rate (1980-87)	-0.1%
GDP Growth Rate (1987-89)	3.0%
Distribution of GDP	
Agriculture	12%
Industry	36%
(Manufacturing)	(23%)
Services etc.	52%
Portion of budget spent on	
Education	3.3%
Telecoms	3.2%

Correspondence study is offered through the national Correspondence College at Luanshya, the Department of Correspondence Studies of the Centre for Continuing Education at the University of Zambia, and private correspondence colleges run by foreign companies but registered with the government. The Centre for Continuing Education was formed in 1975 through the merger of the former Department of Extramural Studies, the Department of Correspondence Studies and the Institute of Education. It offers a one year certificate and a two year diploma in adult education, and a two year diploma in teacher education through extramural and correspondence courses.

The curricula and activities of private correspondence colleges are monitored by the Department of Continuing Formal Education.

The Ministry of Education and Culture is the constitutional body responsible for national education. Educational Broadcasting Services (EBS) is a department of the Ministry of Education and Culture. EBS comprises the Educational Radio Service, the Educational Television Service, and the Audiovisuals Unit.

- The Educational Radio Service (ERS), based in Lusaka, broadcasts programs from grade five through form five in addition to programs for adults and teachers. Schools in all regions are equipped to receive these programs, which offer courses in English, social studies, science and adult education, the last under the direction of the National Correspondence College. All programs transmitted by ERS are locally produced and based on prescribed syllabi.

- The Educational Television Service (ETS), based in Kitwe where there is a television studio, covers only the most populated regions. Programs are mostly produced for primary schools and cover social studies, science, creative activities, religious education and art. Most of the programs are locally produced.

- The Audiovisuals Unit services the entire school system. The unit produces films under a Finnish aid project and also distributes materials and hardware.

LITERACY RATES (%)	
Total	68.6
Males	79.3
Females	58.3

PERCENTAGE OF AGE GROUP ENROLED IN EDUCATION (1986)	
PRIMARY	
Total	104
Males	112
Females	101
SECONDARY	
Total	19
Males	24
Females	14
TERTIARY	
Total	1.4
Males	2.3
Females	0.6

Correspondence is offered through the national Correspondence College, the Department of Correspondence Studies of the Centre for Continuing Education at the University of Zambia, and private correspondence colleges.

Zambia has an Educational Broadcasting Service which comprises the Educational Radio Service, the Educational Television Service, and the Audiovisuals Unit.

The Educational Broadcasting Service has managed to continue expanding despite financial difficulties. Two radio studios, located in Lusaka, are used to record programs. These are sent to the Ministry responsible for broadcasting. Studio technicians are employees of the Ministry of Education. EBS has also managed to establish support services, carried out by the Audio-

INTELECOM

Visual Division, for typing, copying, producing and distributing of teachers' booklets, maps, wall charts, 16mm films and slides.

Zambia has used some creative ingenuity to make radio and television programs interesting and useful to formal education. The more successful programs have aimed at teaching the core of the curricula. For example, educational broadcasts have been used to show real historical places, and series have been prepared on environmental science and the cultural and economic lives of the rural dwellers and townspeople. These have been broadcast on both radio and television for at least ten years. Such local programs make up a large portion of educational broadcasts, but some foreign produced material is also used.

DIRECT EXCHANGE LINES	
Capacity	92,370
DELs in use	58,490
Per 100	0.77
Residential	52%
Automatic	100%
Wait list	29,110
Demand	87,600
TELEPHONE SETS	
Number	91,580
Per 100	1.21
Urban	85%
Quality of Service	40.0%

The telecommunications infrastructure in Zambia is one of the more highly developed, and despite economic constraints in the recent past, telecommunications developments have seen good progress, and service quality is relatively good. Some recent developments have included the creation of a high quality national, PTC-owned transmission network suitable for both internal and regional transit use. Also, major digital exchange installations have been completed in Ndola, Livingstone, and Lusaka. Current activities and plans for future developments show a strong emphasis on outside plant, local subscriber connections and institutional development. In the area of rural telecommunications, PTC has a good number of rural automatic exchanges throughout the country. Also, new microwave links to Luapula, Northern and Eastern Provinces have been installed. These have facilitated the extension of the infrastructure and opened up automatic service into new areas. PTC will also be installing 25 multi-access radio systems to extend rural subscriber networks. Zambia is the regional transit point for international communications for the region.

FACSIMILE	
Bureaufax	
Telefax	111
DATA TERMINALS	141
LEASED CIRCUITS	30
TELEX SUBSCRIBER LINES	2520

Zambia is not as well developed with respect to its radio broadcasting facilities. There are only two other countries (Lesotho and Tanzania) that have fewer radios per 100 population than Zambia. Zambia has the least number of radio broadcast hours per day. With respect to coverage, Zambia has somewhat poor area and population coverage for the region.

The country fares a little better in terms of television broadcasting, having the second highest penetration per 100 people surpassed only by Zimbabwe. Since 1980, television coverage in Zambia has been extended to all the country's provincial capital towns. Plans are now under way to supply television sets to some schools in the provincial capital towns of Western, North Western and Luapula Provinces. If this were accomplished it would mark a major expansion in educational broadcasting by extending services to rural town schools.

RADIO BROADCASTING	
Receivers	
Number	550,000
Per 100	7.63
Rank	10th
Transmitters	
MF	4
HF	12
VHF	6
Total	22
Ownership	Gov't
Broadcast services	3
Daily Hours	7
Rank	7th
Coverage	
Population	60%
Area	40%
TELEVISION BROADCASTING	
Receivers	
Number	110,000
Per 100	1.53
Transmitters	12
Ownership	Gov't
Channels	1
Daily hours	6
Coverage	
Population	60%
Area	45%

Zambia Broadcasting Services (ZBS) forms part of the Ministry of Information and Broadcasting Services. ZBS is divided into five divisions: Administration, Engineering, Sound Broadcasting (Radio Zambia), Television (TVZ), and the External Broadcasting Service.

ZBS has a Mass-Media complex, which consists of radio and television studios. The television studios have been complemented by new television transmitters designed to provide coverage along the line of rail between Chililabombewe to Livingstone. To take television services to other parts of the country, regional television transmitter stations were planned for population centres along the Pan-African microwave link routes. To boost radio reception, 25 regional medium-wave transmitter stations were planned. These were to be supplemented by FM transmitters to be installed side by side with regional television transmitters.

Radio Zambia broadcasts on three channels. Two of these, the Home Service and the General Service, are broadcast on a national basis but contributions can originate from the regional studios located at Kitwe and the Copperbelt. The third service is the External Service.

Responsibility for planning and production of schools broadcasts rests with the Ministry of General Education and Culture. This Ministry has its own broadcasting unit at the old broadcasting station. The University of Zambia also has its own unit.

The Zambia PTC staff training centre and the PTC headquarters are located in Ndola, in the Copperbelt. The staff training centre can accommodate up to 150

trainees in hostel style accommodation. The staff training centre has developed and uses a modular system for training. The centre conducts courses under four main categories: telecommunications engineering; telecommunications operations; postal operations; and management. There are a number of practical laboratories with transmission systems, multiplex equipment, switching exchanges and teleprinter equipment. The external plant section has underground and overhead cable facilities. The school is equipped with a variety of training technologies including overhead projectors, slide projectors, and cassette recorders.

TELECOMMUNICATIONS TRAINING

The Zambia PTC staff training centre conducts courses in telecommunications engineering, telecommunications operations, postal operations, and management. A modular training system is used. A number of training laboratories are available for practical training.

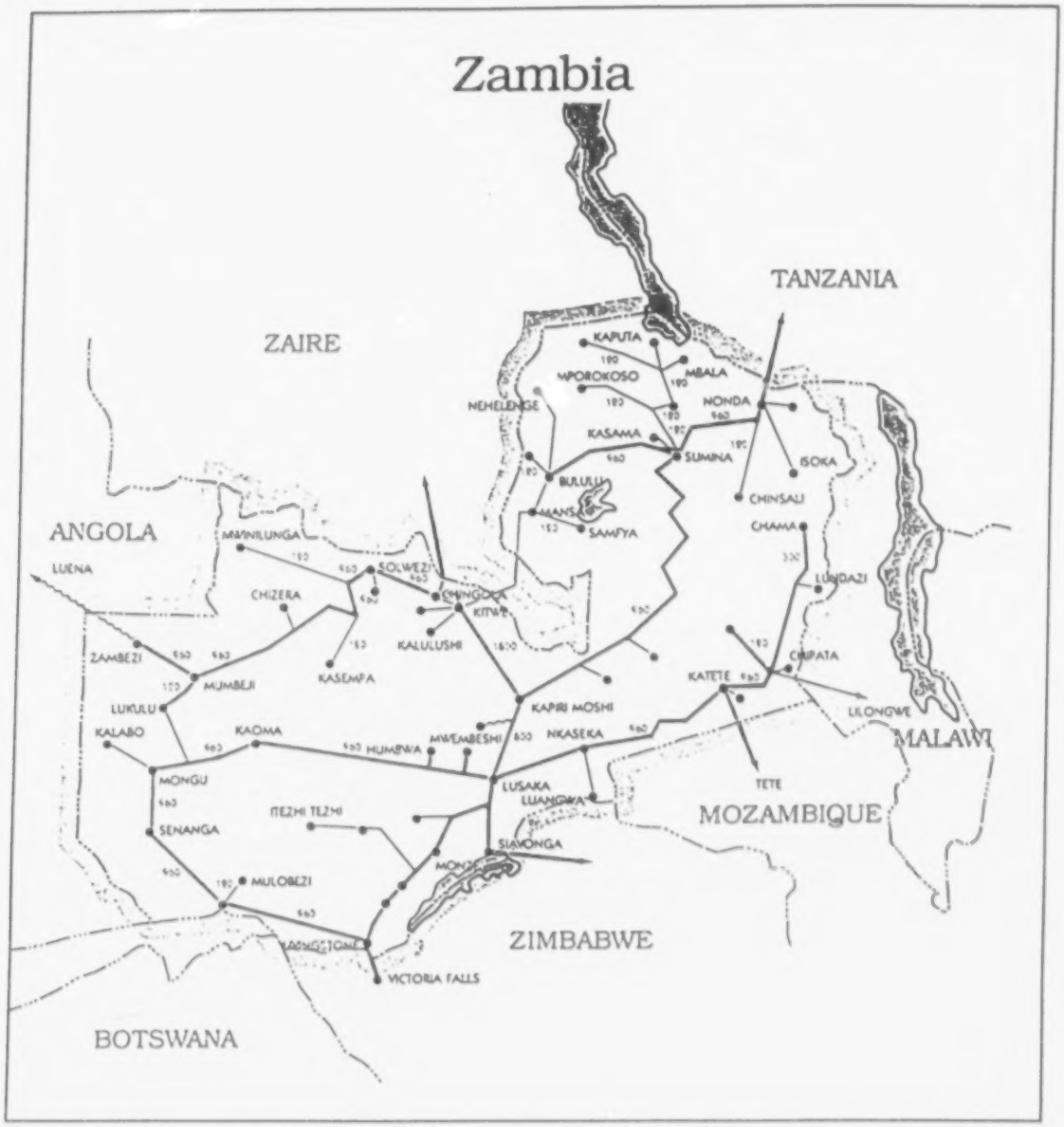
Zambia Broadcasting Services do not have a training section. Training is undertaken by the government through the Directorate of Manpower, Development and Training, which caters for all government ministries and departments. Insufficient training is provided through this mechanism, and ZBS thus depends on sponsorships from international organisations and countries. Most of the current trained staff in ZBS received training in this way. At present, ZBS technical and production staff are being sent for training or have been trained by the BBC, Germany, Egypt, the Netherlands, Japan, Italy, the USA, UNESCO, the University of Zambia, URTNA, and others. The training takes place both in Zambia and abroad. The Zambia Institute of Mass Communications has recently been established under the Ministry of Information and Broadcasting Services. It runs short courses for mass media personnel. Plans are in the works to introduce longer, more detailed courses. It is hoped ZBS personnel will be able to benefit from this institute.

BROADCASTING TRAINING

Broadcast training is undertaken by the government through the Directorate of Manpower, Development and Training. However, Zambia Broadcasting Services (ZBS) also depends on international sponsorships, particularly for technical training, since training through the Directorate is insufficient for their needs.

The Zambia Institute of Mass Communications was recently established under the Ministry of Information and Broadcasting Services.

Zambia broadcasting suffers from staff shortages. In 1987, they held only sixty percent of their required staff strength. Zambia has actively used freelancers who have made significant contributions to ZBS, including in the area of educational broadcasting services.



EXISTING TELECOMMUNICATIONS NETWORK

ZIMBABWE

Zimbabwe has a relatively low population density, a moderate level of urbanisation and a relatively low urbanisation growth rate. Only two other countries in this study are less densely populated than Zimbabwe (namely, Botswana and Zambia).

POPULATION	9,000,000
POPULATION GROWTH RATE	3.0%
AREA	391,000 sq km
POPULATION DENSITY	23.0 p/sq km
URBANISATION	26%
URBANISATION GROWTH RATE	6.3%

Zimbabwe's economic performance has been quite positive. The economy is helped by the fact that Zimbabwe has quite a well diversified industrial base, a good resource base, a sound infrastructure, and the government has also encouraged agricultural growth through well conceived policies. Zimbabwe's GDP per capita is one of the highest for the region.

Budget allocations to education in Zimbabwe are very high by African Commonwealth standards, being surpassed only slightly by one country, Botswana. Expenditures on telecommunications are not as positive. Zimbabwe ranks among the lowest with respect to the proportion of budget spent on telecommunications developments.

GDP (millions US$)	5240
GDP per capita	582
GDP Growth Rate (1980-87)	2.4%
GDP Growth Rate (1987-89)	4.5%
Distribution of GDP	
Agriculture	11%
Industry	43%
(Manufacturing)	(31%)
Services etc.	46%
Portion of budget spent on	
Education	8.2%
Telecoms	0.6%

The high priority placed on education in Zimbabwe is reflected in its literacy and enrolment data. Zimbabwe has the highest rate of adult literacy in the African Commonwealth, save for Tanzania. At all levels of education, Zimbabwe meets or surpasses the other countries in percentage enrolment.

There is little use of distance education in Zimbabwe, but given financial limitations and teacher shortages in the country, greater use may be made of distance teaching approaches, particularly through radio, in the future. One of Zimbabwe's four radio services, Radio 4, is an educational channel. At present, a program called the ZIM-SCI programme, developed in the University of Zimbabwe's Department of Curriculum Studies, is in use. This program uses distance teaching methods to support science instruction in rural schools, where teachers may have relatively little scientific training.

The government has plans to establish communications centres in the districts. These centres will have telephones, postal services, a library and rooms in which the public can watch television and listen to the radio. Development oriented programs are planned. Television will use batteries and solar energy where electricity is not yet installed.

Zimbabwe's telecommunications infrastructure is one of the most well developed in the region. Only Swaziland has more DELs per 100 than Zimbabwe. Investments since independence have resulted in a major improvement in international service, and an extensive national and regional transmission network. However, service quality has been severely compromised in many parts of the country because the development of local networks has not kept pace with the demand for service from Zimbabwe's relatively sophisticated economy and populace. There has been severe congestion in both the local and trunk networks. However, this is currently being addressed by a major digitalisation program and cable network rehabilitation in Harare and the other key urban centres.

LITERACY RATES (%)	
Total	76.0
Males	81.5
Females	66.8
PERCENTAGE OF AGE GROUP ENROLED IN EDUCATION (1986)	
PRIMARY	
Total	129
Males	132
Females	126
SECONDARY	
Total	46
Males	55
Females	37
TERTIARY	
Total	3.7
Males	4.7
Females	2.8

One of Zimbabwe's four radio services, Radio 4, is dedicated to education. It is expected Zimbabwe will begin to use more distance education methods in the future.

Although over 60% of the network is concentrated in Harare and the surrounding areas in Mashonaland Province, Zimbabwe in fact has the highest percentage of rural subscribers amongst the group of countries studied. In the early 1980s, a major program was undertaken to automate the small town and rural networks by replacing manual switchboards with refurbished electromechanical switches. Each of these has fairly extensive open wire networks reaching out into surrounding areas and the PTC has tried to extend service farther by installing approximately 15 multi-access subscriber radio systems. Some of these are providing much improved service, although the quality has not always been as high as hoped due to deficiencies in technical support. However, on balance, several areas of the country have a fairly good basic rural service, including to schools and community administrative offices.

Zimbabwe has one of the lowest number of radio receivers per 100 population for the group being studied. This is curious since the country also has some of the best coverage by population and area (surpassed only by Nigeria and

DIRECT EXCHANGE LINES	
Capacity	157,280
DELs in use	118,430
Per 100	1.27
Residential	70%
Automatic	99%
Wait list	41,340
Demand	159,770
TELEPHONE SETS	
Number	282,090
Per 100	3.03
Urban	51%
Quality of Service	180.0%

Swaziland which both have 100% coverage). By contrast, Zimbabwe has the highest rate of television receivers per 100 population. Zimbabwe Broadcasting Corporation (ZBC) operates five services: Radios 1, 2, 3, 4, and Zimbabwe TV. As previously stated, Radio 4, in operation since 1982, provides an educational and special information service. ZBC's main production centre is in Harare, but Bulawayo also produces important programs. The educational channel works from a broadcasting centre known as Mbane Studios, which is shared with Radio 2.

Program policy for Radio 4 stipulates that programs for this channel will be of a general educational nature falling under two broad categories, formal and nonformal educational programs. Formal educational programs include all programs for schools, colleges and the University. It is the sole responsibility of the Ministry of Education and Culture in conjunction with Audio-Visual Services to produce Formal Educational programs. An Educational Advisory Committee works as watch dog of Radio 4 programming.

FACSIMILE	
Bureaufax	10
Telefax	380
DATA TERMINALS	890
LEASED CIRCUITS	820
TELEX SUBSCRIBER LINES	2583

Telecommunications training at the Zimbabwe PTC Training College is relatively extensive. The ITU has provided strong support in curriculum development over the past 5-10 years. All of the following five major areas are covered: telecommunications principles, switching systems, transmission systems, telegraph and data systems, and external plant. There are 16 full time instructors at this college, located in the western suburbs of Harare. Specialist assistance is also provided by PTC operations staff. As most African countries, Zimbabwe relies heavily on outside assistance for training in the more advanced technological areas. In this regard, PTC has welcomed help from donor countries such as Norway and Italy and has also hosted several regional training courses sponsored by SATCC in areas such as traffic engineering and local network planning. Also common to other countries of the region, the PTC's training program is weak in the area of professional and management upgrade training, for engineers, as well as in upgrade training for senior technicians. The latter are expected to study for UK City and Guilds examinations on their own. Given the size of the network and the relative sophistication of the Zimbabwean workforce, the PTC therefore needs a better integrated human resource development program.

The Zimbabwe Polytechnic in Harare offers training for one to two years in areas including business studies, electrical engineering and computer studies. It is part of the national technical college system in Zimbabwe which has 7 campuses throughout the country.

In 1988, the Southern Alberta Institute of Technology (SAIT) requested funding to introduce computer managed learning (CML) to the Harare Polytechnic (and later, using distance education methods, throughout the national college system). In 1990, a project was undertaken at the Gweru College. Initially, mathematics courses were offered, but plans were to extend course offerings to include electronics, electricity and accounting. The initial idea of extending the course offerings using distance education has not been pursued, partly because the service requires being on-line using telecommunications facilities, and the quality of the public network is insufficient for this at this time.

Broadcast training was essential to the continued strength of Zimbabwe's broadcasting services after independence, due particularly to staff turnover. Training came from UNESCO, Europe and from experts within the country to train new broadcasting staff members. Some individuals were sent abroad for training periods ranging from three weeks to eighteen months.

In-house training, including technical training, has also been established but more needs to be done in this area.

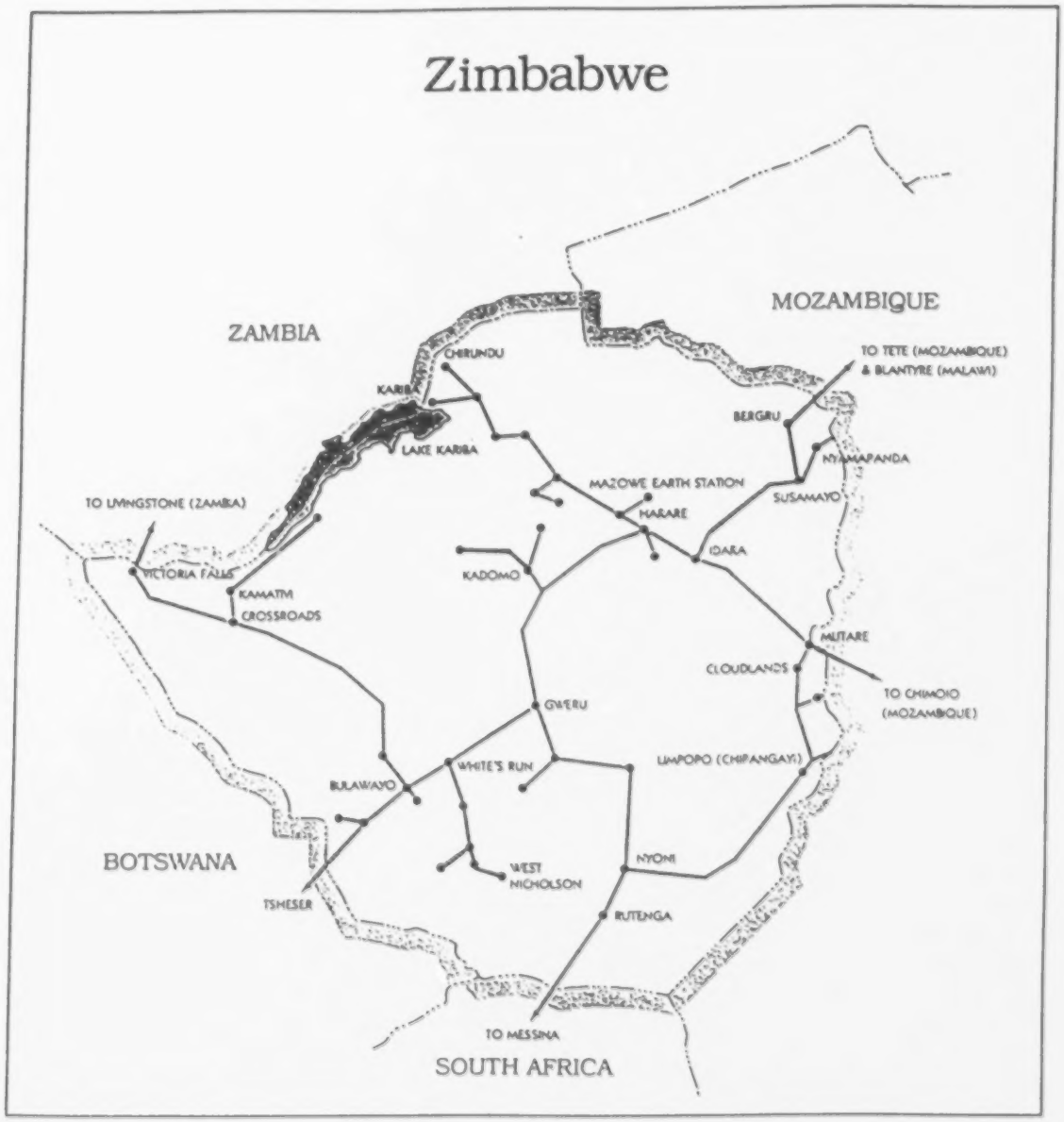
RADIO BROADCASTING	
Receivers	
Number	750,000
Per 100	8.30
Rank	9th
Transmitters	
MF	10
HF	3
VHF	70
Total	83
Ownership	Public
Channels	4
Daily Hours	19
Rank	2nd
Coverage	
Population	96%
Area	88%
TELEVISION BROADCASTING	
Receivers	
Number	193,000
Per 100	2.13
Transmitters	16
Ownership	Govt/Pub
Channels	2
Daily hours	8
Coverage	
Population	57%
Area	47%

TELECOMMUNICATIONS TRAINING

There is extensive training in telecommunications provided at the PTC Training College. This is supplemented by outside assistance for more advanced technical training.

BROADCAST TRAINING

In-house training, including technical training, is available in broadcasting, but much more needs to be done in this area.



EXISTING TELECOMMUNICATIONS MAIN TRANSMISSION NETWORK

APPENDIX B: MULTI-ATTRIBUTE COMPARISON MODEL

CRITERIA/ATTRIBUTES	BOTSWANA	GAMBIA	KENYA	LESOTHO	MALAWI	NIGERIA	S.LEONE	SWAZILAND	TANZANIA	UGANDA	ZAMBIA	ZIMBABWE
Geo-demography	(Score indicates ranking from 1 to 12)											
- Area	4	12	4	10	8	2	9	11	1	7	3	6
- Pop'n density	12	2	8	5	3	1	6	7	9	4	11	10
- Urbanisation	8	8	7	10	11	2	4	4	3	12	1	4
Development & Educ.												
- GDP per capita *	1	5	6	10	11	8	4	2	12	9	7	3
- % GDP in agric. *	12	7	5	9	4	6	3	7	2	1	10	11
- Total literacy	4	11	7	3	10	9	12	6	1	8	5	2
- prim. enrolment *	3	10	6	2	11	7	12	3	9	8	3	1
- sec. enrolment	3	8	6	5	11	4	8	2	12	10	7	1
Gov't exp. priority												
- education	1	8	3	5	5	12	10	4	10	9	7	2
- telecoms	1	4	7	5	6	9	9	2	9	9	3	8
Telecoms network												
- tel density	3	7	4	6	9	8	11	1	10	12	5	2
- % rural	5	9	8	9	2	7	11	3	11	5	4	1
- Service quality	1	8	4	4	1	4	8	8	8	8	1	4
Broadcast radio												
- penetration	6	5	8	11	2	3	1	4	12	7	10	9
- area coverage	5	6	3	9	10	1	10	1	7	7	12	3
- hours per day	8	10	5	2	1	2	11	5	5	8	12	2
Television service												
- no. transmitters *	10	10	6	7	10	1	8	4	8	4	3	2
- area coverage *	9	9	7	9	9	1	5	2	8	6	4	3
- hours per day *	9	9	3	9	9	1	3	3	7	7	3	2
- penetration	5	12	7	9	9	8	4	3	9	6	2	1
Existing Programs	("1" = Yes)											
- Correspondence	1		1	1	1	1		1	1	1	1	
- Univ/Col outreach	1	1	1			1				1	1	
- Schools broadcast	1	1	1	1	1	1	1	1	1		1	1
Criteria analysis	(High score indicates suitability)											
- Geo-demography	29	11	24	18	19	14	14	13	24	22	22	21
- Development need	5	21	20	16	31	22	26	11	32	29	13	6
- Gov't priority	24	14	16	16	15	5	7	20	7	8	16	16
- Existing programs	30	20	30	20	20	30	10	20	20	20	30	10
- Infrastructure												
Telecoms	30	15	23	20	27	20	9	27	10	14	29	32
Radio broadcast	20	18	23	17	26	33	17	29	15	17	5	25
TV broadcast	11	11	23	14	11	36	23	30	16	22	29	32
	--	--	--	--	--	--	--	--	--	--	--	--
Infrastructure	61	44	69	51	64	89	49	86	41	53	63	89
Total score	149	110	159	121	149	160	106	150	124	132	144	142
Alt. scenarios:												
Geo-dem. w/low dens.	18	20	21	21	26	25	15	12	19	27	13	14
Alternate total	138	119	156	124	156	171	107	149	119	137	135	135
Literacy & enrolment	29	10	20	29	7	19	7	28	17	13	24	35
Modified total	178	120	179	150	156	179	113	178	141	145	168	177
Modified alt. total	167	129	176	153	163	190	114	177	136	150	159	170

APPENDIX C: EXISTING CORRESPONDENCE AND DISTANCE EDUCATION PROGRAMS

COUNTRY	CORRESPONDENCE PROGRAMS	USE OF TECHNOLOGY FOR DISTANCE EDUCATION
BOTSWANA	Correspondence courses are offered through the Botswana Extension College, a section of the Department of Nonformal Education. Fifteen study centres are in operation throughout the country for correspondence students. The Nonformal Education Centre at Matsha Community College in Kang has played an important role in nonformal education development. The Institute of Adult Education at the University of Botswana is committed to outreach programs. The Rural Extension Coordinating Committee coordinates projects initiated by the various ministries and the University.	Radio is an important technical aid for teachers in Botswana. Broadcasting of schools programs is the responsibility of the Schools Broadcasting Service. The Department of Curriculum Development and Evaluation, through a special unit called the Educational Broadcasting Unit, produces radio lessons (based on the syllabi) and a/v aids to accompany the radio lessons.
THE GAMBIA	No information on availability of correspondence courses.	Schools Broadcasting has been available at the primary level since 1979. Also, Rural Broadcasting and Adult Education was created to be responsible for a number of programs and services. A second radio channel is planned. Once operational, one channel will be devoted to Schools Broadcasting.

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KENYA	Correspondence education is provided through the College of Adult and Distance Education of the University of Nairobi. The College has its own studios. A continuing education program (primarily concerned with literacy) is also in place. Planning initiatives by the government look towards improving the availability of correspondence education, including at the higher education up to degree level.	The Voice of Kenya, under the Ministry of Information, broadcasts school programs prepared by the Kenya Institute of Education in Nairobi. Radio and the rural press are used extensively in the literacy programs.
LESOTHO	The Lesotho Distance Education Centre (LDTC) was established with the help of the International Extension College to expand the use made of distance teaching methods in Lesotho. Its activities include correspondence courses at junior certificate and Cambridge Overseas School Certificate levels. LDTC also provides support and materials for the inservice training of unqualified teachers at the National Teacher Training College. Teachers enroled in Lesotho's Inservice Education for Teachers Certificate Program are automatically enroled in the correspondence institute.	LDTC provides communications support in the form of visual aids, pamphlets, training for field workers, instructional booklets and radio programs. There is provision in the schedules of Radio Lesotho for educational broadcasts, but the Ministry of Education lacks facilities and staff to make much use of the air space. The most significant educational users of radio are the Distance Education Centre, the Agricultural Information Service and the Health Education Unit.

MALAWI	Correspondence education is available, provided mainly through the Malawi Correspondence College and Broadcast Unit which is run and financed by the Ministry of Education. Other correspondence colleges, including some from abroad, also provide courses. There are some 70 correspondence college centres and night schools which give 2 to 4.5 hours' direct teaching each day, supplemented by a daily 45 minute broadcast put out by the Schools Broadcasting Unit.	The Broadcasting Unit supplements the courses offered by the Correspondence College by providing radio programs and a tape service whereby schools send blank tapes to the Unit on which it records specially requested materials. The Malawi Broadcasting Corporation cooperates with the Correspondence College and Broadcasting Unit to offer courses. Broadcasting is carried out mainly between 9:00 and 12:00 am on weekdays. Primary schools and correspondence college centres have been supplied with radios from various donors, through the Ministry of Education, while secondary schools use the tape service more.
NIGERIA	A number of Universities and institutions offer distance education programs. The University of Lagos has sponsored and supported the Correspondence and Open Studies Unit operating as a department of the University. For some years, the University of Ife organised evening degree courses in a style similar to that of the Open University in the UK. It is unclear if this is still in place.	The Federal Radio Corporation of Nigeria (FRCN) provides broadcast services from four linguistic zones with zonal broadcasting centres in Enugu, Kaduna, Ibadan and Lagos. The latter has responsibility for educational services. Nigeria's television broadcasting infrastructure was developed on the pretext of being valuable for education. Educational broadcasts were the joint responsibility of the Ministry of Education and the television station of each region which broadcast them.

	The National Teachers Institute (NTI) at Kaduna has offered a distance learning program. Other correspondence colleges, both local and foreign, have branches throughout Nigeria.	(Still the case?) The broadcasts were based on school syllabi. There is a National Educational Technology Centre in Nigeria which continues to produce educational television broadcasts for schools.
SIERRA LEONE	There is no evidence of correspondence programs in Sierra Leone.	Broadcasting has been used for educational purposes. In 1981, the country broadcast educational programs for 10 hours per week.
SWAZILAND	Nonformal education in Swaziland includes an intensive program of correspondence courses leading to the junior certificate examination. Enrolment numbers over 1500 individuals per year. This program is supervised by the Swaziland International Education Centre (SIEC).	The Swaziland Broadcasting Service (SBS) allots about 18 hours weekly for educational broadcasting. During school terms, one third of all weekday programs are directed to school use. The Ministry of Education, aided by UNESCO, has conducted training courses in the production of educational television programs. A special studio was built for educational television program production and broadcasting. Some schools have received television sets donated by a commercial company.

TANZANIA	An adult education scheme was started in Mwanza to improve adult literacy rates in the country. Correspondence courses are available to untrained teachers. Coordination of adult education programs and administration of mass radio study and correspondence courses are the responsibility of the Institute of Adult Education.	The adult literacy campaign uses radio and print. Radio broadcasting has been used extensively for educational purposes. Programs were designed to assist but not replace teachers. Radio Tanzania uses a system of involving listeners and outside experts in planning and preparation of programs. There are committees for schools broadcasts and adult education. The Committee for schools broadcasts is comprised of members from the Institute of Education, the Institute of Adult Education, the Ministry of National Education and Radio Tanzania. At least 300 hours per year are devoted to educational programs, 200 hours for primary schools, and 100 hours for secondary schools.
UGANDA	Uganda is committed to expanding education. The Centre for Continuing Education at Makerere University now offers correspondence courses. The African Adult Education Association (AAEA), now a regional body, was founded at Makerere University. AAEA promotes and serves as a clearinghouse for information on adult education programs.	Radio is widely used for inservice teacher training and inservice training of English language instruction in all primary grades.

ZAMBIA	Correspondence study is offered through the National Correspondence College at Luanshya, the Department of Correspondence Studies of the Centre for Continuing Education at the University of Zambia, and private correspondence colleges run by foreign companies but registered with the government.	Educational Broadcasting Services, a department of the Ministry of Education and Culture, comprises the Educational Radio Service, the Educational Television Service, and the Audiovisuals Unit. The Educational Radio Service (ERS), based in Lusaka, broadcasts programs from grade five through form five in addition to programs for adults and teachers. Schools in all regions are equipped to receive these programs, which offer courses in English, social studies, science and adult education, the last under the direction of the National Correspondence College. All programs transmitted by ERS are locally produced and based on prescribed syllabi. The Educational Television Service (ETS), based in Kitwe, covers only the most populated regions. Programs are mostly produced for primary schools and cover social studies, science, creative activities, religious education and art. Most of the programs are locally produced. The Audiovisuals Unit services the entire school system. The unit produces films under a Finnish aid project and also distributes materials and hardware. The Educational Broadcasting Service in Zambia has managed to continue expanding despite financial difficulties.

ZIMBABWE	There is little use of distance education, but given financial limitations and teacher shortages in the country, greater use may be made of distance teaching approaches, particularly through radio, in the future. Distance teaching methods to support science instruction in rural schools has been used. The government has plans to establish communications centres in the districts. These centres will have telephones, postal services, a library and rooms in which the public can watch television and listen to the radio.	One of Zimbabwe's four radio services, Radio 4, is an educational channel. Program policy for Radio 4 stipulates that programs for this channel will be of a general educational nature falling under two broad categories, formal and nonformal education. Formal education programs include all programs for schools, colleges and the University. It is the sole responsibility of the Ministry of Education and Culture in conjunction with Audio-Visual Services to produce Formal Educational programs. An Educational Advisory Committee works as watch dog of Radio 4.

APPENDIX D: SUMMARY OF COUNTRY COMPARATIVE ANALYSIS

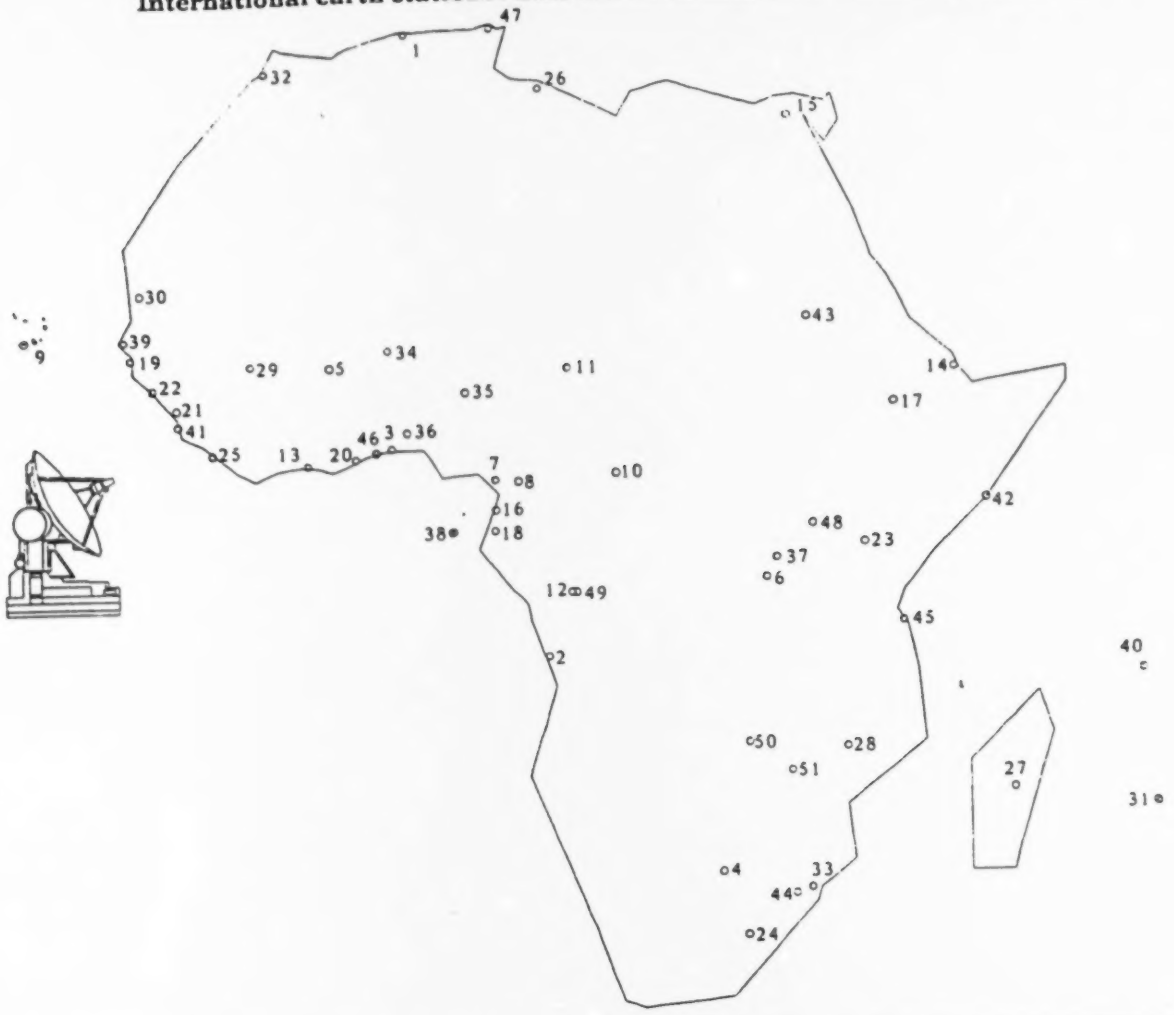
COUNTRY	POSITIVE INDICATORS	ASSESSMENT
BOTSWANA	■ Geography and demography ■ Government priority ■ Telecommunications infrastructure ■ High existing level of interest ■ Favourable literacy and educational level	Ranks highly unless its very low population density is considered to be a negative factor.
THE GAMBIA	■ Developmental need only	Low score.
KENYA	■ Geography and demography ■ Government priority ■ Telecommunications and broadcasting infrastructure ■ High existing level of interest	Ranks highly under all scenarios considered.
LESOTHO	■ Government priority ■ Moderate existing level of interest ■ Favourable literacy and educational level	Not highly ranked but holds some possibilities.
MALAWI	■ High developmental need ■ Telecommunications and radio broadcast infrastructures ■ Moderate existing level of interest ■ demographically attractive if total reach is important, in view of high population density	Ranks highly, especially if population coverage is considered important

NIGERIA	■ High developmental need ■ Strong broadcast radio and television infrastructures and moderately extensive telecommunications network ■ High existing level of interest ■ Demographically attractive if total population reach is considered important	Ranks highly under all scenarios.
SIERRA LEONE	■ High developmental need	Low score.
SWAZILAND	■ Government priority ■ All communications infrastructures are relatively strong (except there may be a reliability problem with telecommunications) ■ High literacy and educational level	Ranks highly due to its strong infrastructure and high educational level.
TANZANIA	■ Geography and demography ■ Developmental need ■ Moderate existing level of interest	Moderate to high level of literacy and existing experience of distance education.
UGANDA	■ Developmental need ■ Moderate existing level of interest ■ Demographically attractive if total population reach is considered important. However the infrastructures are not strong.	Moderate.

ZAMBIA	■ Government priority ■ Strong telecommunications and television infrastructures ■ High existing level of interest ■ High literacy and educational levels	Ranks moderate to high, with proven experience.
ZIMBABWE	■ Government priority ■ All communications infrastructures, with the caveat that the reliability of the telecommunications service is low in many localities ■ High literacy and educational levels	Ranks moderate to high, although distance education appears not to have been tried extensively to date.

APPENDIX E: NATIONAL AND INTERNATIONAL EARTH STATIONS

International earth stations / Stations terriennes internationales (1988)



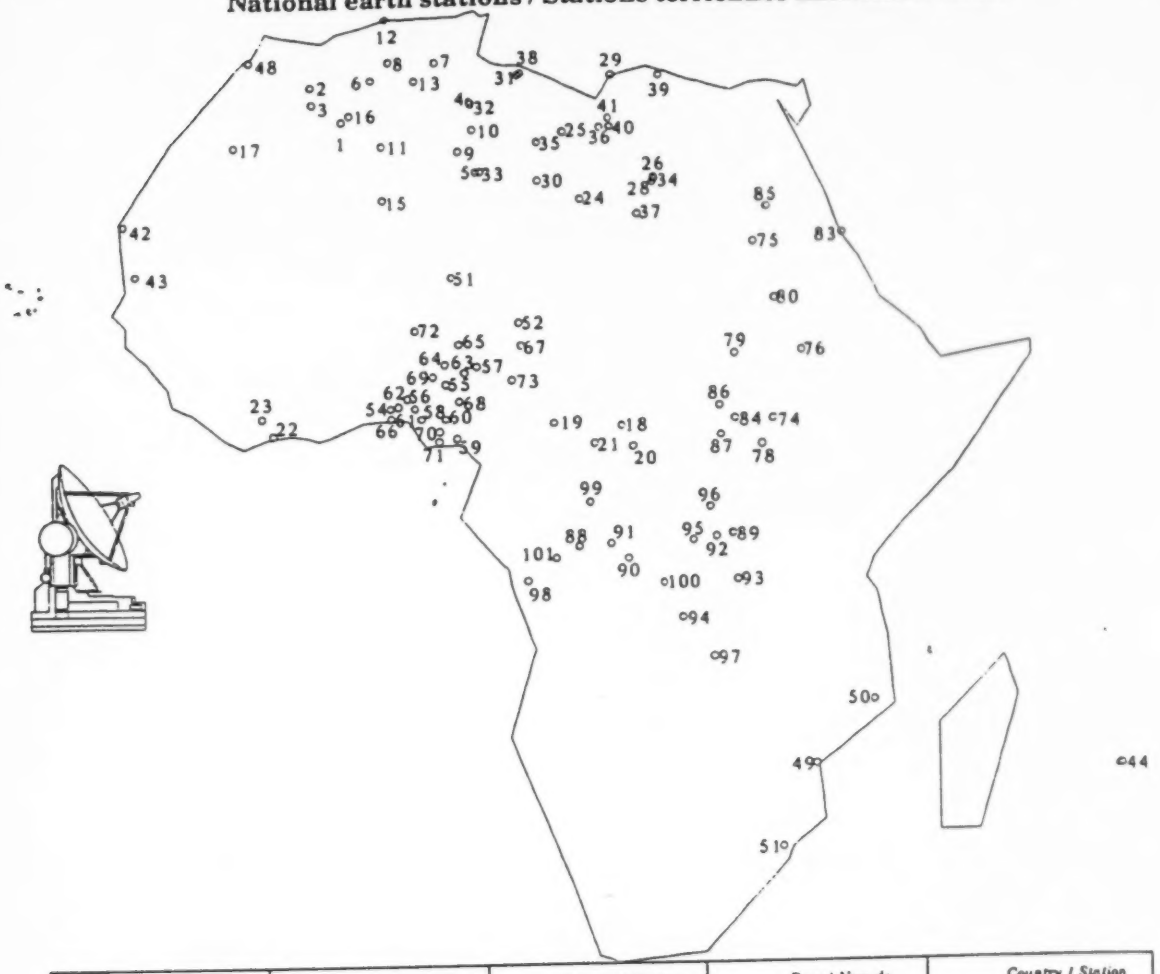
	Country	Name	Sat.
1	Algérie	Lakhdaria 1	60.00
		Lakhdaria 3	335.50
		Lakhdaria 4*	346.00
		Lakhdaria 5**	26.00
2	Angola	Cacuaco 1	335.50
		Cacuaco 2	325.50
3	Bénin	Abomey-Calavi	335.50
4	Botswana	Kgale	325.50
5	Burkina Faso	Somgande 1	325.50
		Somgande 2	338.50
6	Burundi	Bujumbura 1	60.00
		Bujumbura 2	307.00
7	Cameroun	Douala	335.50
8		Zamengoe	335.50
9	Cape Verde	Varzea	335.50
10	Rép. centrafr.	Mpoko 1	325.50
11	Tchad	Goudji	332.50
12	Congo	Mougouni	335.50
13	Côte d'Ivoire	Abidjan 1	325.50
		Abidjan 2	335.50
14	Djibouti	Ambouli	60.00
15	Egypt	Maadi 1	335.50
		Maadi 2	60.00
16	Eq. Guinea	Bata	325.50
17	Ethiopia	Sululta 1	335.50

	Pays	Nom	Sat.
17	Ethiopie	Sululta 2	60.00
18	Gabon	Franceville	335.50
		N'keltang 1	335.50
		N'keltang 2	325.50
19	Gambie	Banjul	325.50
20	Ghana	N'kutunse	335.50
21	Guinée	Wonkifong	325.50
22	Guinée Bissau	Bissau	335.50
23	Kenya	Longonot 1	60.00
		Longonot 2	335.50
24	Lesotho	Ha Sofonia	341.50
25	Liberia	Sinkor	325.50
26	Libya	Tripoli 2	335.50
		Tripoli 3	60.00
27	Madagascar	Philibert Tsira	60.00
28	Malawi	Kanjedza 1	60.00
		Kanjedza 2	341.50
29	Mali	Sullymanb'g 1	325.50
		Sullymanb'g 2	335.50
		Sullymanb'g 3	325.50
30	Mauritanie	Toujounine	335.50
31	Maurituis	Cassis 2	60.00
32	Maroc	Sehoule	335.50
33	Mozambique	Boane 1	335.50
		Boane 3	335.50

	Country	Name	Sat.
34	Niger	Goudel	60.00
35	Nigeria	Kujama	325.50
36		Lanlate 1	60.00
36		Lanlate 2	335.50
37	Rwanda	Kicukiro	60.00
38	S.T.& Principe	Sao Marcal	335.50
39	Sénégal	Gandoul	335.50
40	Seychelles	Bon Espoir	60.00
41	Sierra Leone	Wilberforce	325.50
42	Somalia	Kaarsan	60.00
43	Sudan	Umm Haraz 1	335.50
		Umm Haraz 2	335.50
44	Swaziland	Ezulwini	341.50
45	Tanzania	Mwenge 1	60.00
		Mwenge 2	332.50
46	Togo	Cacavelli	335.50
47	Tunisie	Dkhila 1	335.50
		Dkhila 2**	26.00
48	Uganda	Mpoma	335.50
49	Zaire	N'sele	335.50
50	Zambia	Mwembeshi 1	60.00
		Mwembeshi 2	335.50
51	Zimbabwe	Mazowe	341.50

All Nous INTELSAT except / sauf
**ARABSAT *INTRSPTNK

National earth stations / Stations terriennes nationales (1988)



Country / Station name	Pays / Nom de station	Country / Station name	Pays / Nom de station	Country / Station name
Algérie	Côte d'Ivoire	Mauritanie	60 Calabar	83 Nyala
Satellite @ 66.00	Satellite @ 63.00	Satellite @ 26.00		
1 Adrar	22 Abidjan 3	42 Nouadhibou*	61 Enugu 1	84 Port Sudan
2 Bechar	23 Yamoussoukro	43 Toujounine*	62 Ibadan	85 Rumbeck
3 Beni-Abbes	Libya	Mauritius	63 Ilorin	86 Wadi Halfa
	Satellite @ 332.5	Satellites @ 63		
4 Debdeb	24 Al Fatah	44 Agalega	64 Jos	87 Wau
5 Djanet	25 Al Fuguha	Cassis 1	65 Kaduna	88 Yambio
6 El Golea	26 Al Hawari	Rodrigues	66 Kano	Zaire @ 66.00
7 El Oued	27 Al Jaghbub	St. Brandon	67 Lagos	89 Bandundu
8 Ghardaia	28 At Tallah	Maroc @ 307.00	68 Maiduguri	90 Bukavu
9 Illizi	29 Benghazi	48 Rabat	69 Makurdi	91 Gbadolite
10 In Amenas	30 El Wigh	Mozambique @ 66	70 Minna	92 Gemena
11 In-Salah	31 Garian	49 Beira	71 Owerri	93 Isiro
12 Lakhardia 2	32 Ghadames	50 Nampula	72 Port Harcourt	94 Kalemi
13 Ouargla	33 Ghat	51 Boane 2	73 Sokoto	95 Kamina
14 Reggane	34 Kufra	Niger @ 359.0	74 Yola	96 Kindu
15 Tamanrasset	35 Sabha	52 Agadez	Sudan @ 338.50	97 Kisangani
16 Timimoun	36 Samah	53 Diffa	75 Bor	98 Lubumbashi
17 Tindouf	37 Sarra	54 Niamey 3	76 Dongola	99 Matadi
Rép. centrafricaine	38 Tripoli 4	Nigeria @ 332.50	77 Ed Damazin	100 Mbandaka
Satellite @ 338.5	39 Tubrug	55 Abeokuta	78 El Fasher	101 Mbuji-Mayi
18 Bambari	40 Waha	56 Abuja	79 Juba	102 N'Sele
19 Bouar	41 Zelten	57 Akure	80 Kadugli	All / Tous INTELSAT except / sauf * ARABSAT
20 Kembe		58 Bauchi	81 Khartoum	
21 Mpoko 2		59 Benin City	82 Malakal	

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APPENDIX F: BASIC STATISTICAL DATA

BASIC ECONOMIC INDICATORS

	GDP (MILLIONS US$) 1987	GDP PER CAPITA	GDP GROWTH RATE (%) 1980–87	GDP GROWTH RATE (%) 1987–89	DISTRIB. OF GROSS DOMESTIC PRODUCT (%) 1987 AGRICULTURE	INDUSTRY	(MANUFAC'G) (from Indus)	SERVICES ETC. *	% OF BUDGET SPENT ON EDUCATION (1987)	TELECOMS (1988)
BOTSWANA	1620	1382	13	8.5	3	57	6	40	8.7	7.7
GAMBIA	275	345	–0.8		26	10		65	2.4	2.4
KENYA	6930	314	3.8		31	19	11	50	5.8	0.9
LESOTHO	270	169	2.3	5.5	21	28	15	51	3.8	2.1
MALAWI	1110	141	2.8	4.1	37	18		45	3.8	1.2
NIGERIA	24390	229	–1.7		30	43	8	27	0.8	0.3
SIERRA LEONE	1570	413	0.7		45	19	4	36	1.7	0.3
SWAZILAND	612	860	4.7	8.5	25	30	23	45	5.3	5.1
TANZANIA	3080	129	1.7	2.5	61	8	5	31	1.7	0.3
UGANDA	3560	227	0.4		76	5	5	19	2.3	0.3
ZAMBIA	2030	282	–0.1	3.0	12	36	23	52	3.3	3.2
ZIMBABWE	5240	582	2.4	4.5	11	43	31	46	8.2	0.6

* Services, etc. includes the unallocated share of GDP

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INTELECOM

EDUCATION

	LITERACY RATE			PERCENTAGE OF AGE GROUP ENROLLED IN EDUCATION (1986) See Note 1								
	TOTAL	MALES	FEMALES	PRIMARY			SECONDARY			TERTIARY		
	(%)	(%)	(%)	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE
BOTSWANA	70.8	72.6	69.5	105	101	109	31	29	33	2.2		
GAMBIA	24.9	35.6	15.1	67	82	52	17	24	11			
KENYA	59.2	69.6	49.2	94	97	91	20	25	15	0.8	1.2	0.4
LESOTHO	73.6	62.4	84.5	115	102	127	22	18	26			
MALAWI	41.2			64	72	55	4	6	3	0.6	0.9	0.3
NIGERIA	42.4	53.8	31.5	92	103	81	29					
SIERRA LEONE	23.6	31.2	16.5	54	64	44	17	23	11	1.3	1.9	0.7
SWAZILAND	67.0	69	65	105	106	104	42	42	41	3.7	4.4	3.1
TANZANIA	85.0			69	70	69	3	4	3			
UGANDA	57.0	69.7	45.3	70	76	63	13	16	9	2.9		
ZAMBIA	68.6	79.3	58.3	104	112	101	19	24	14	1.4	2.3	0.6
ZIMBABWE	76.0	81.5	66.8	129	132	126	46	55	37	3.7	4.7	2.8

1 Figures are expressed as the ratio of pupils to the population of school-age children. For some countries with universal primary education, the gross enrollment ratios may exceed 100% because some pupils are younger or older than the country's standard primary school age.

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TELECOMMUNICATIONS DATA

	DELs (1988)								TELEPHONES (1988)			QUALITY
	NUMBER OF LINES (1000s)	DELs PER 100	ANNUAL DEL GROWTH RATE	IN USE (1000s)	% RESI-DENTIAL	% AUTO	WAIT LIST (1000s)	DEMAND (1000s)	NUMBER OF SETS (1000s)	DENSITY PER 100	% URBAN	OF SERVICE (%) *
BOTSWANA	26.33	1.22	28.4%	14.59	38	98	2.95	17.54	26.65	2.22	88	88.7
GAMBIA	6.56	0.63		5.18	86	98	3.17	8.35	7.21	0.88	94	
KENYA	224.16	0.70		157.36	42	92	63.89	221.25	337.01	1.5	93	
LESOTHO	15.08	0.67	7.0%	11.46	25	99	5.33	16.79	19.16	1.13	94	
MALAWI	32.57	0.30	5.4%	23.6	46	96	5.59	29.19	50	0.63	74	
NIGERIA	365.63	0.21		235.53	55	100	290.55	526.08	722.07	0.66	89	
SIERRA LEONE	15.65	0.40		15.5	61	99	3.14	18.64	14.9	0.38	95	
SWAZILAND	16.30	1.43	10.3%	10.53	47	98	2.56	13.09	22.42	3.05	81	282.0
TANZANIA	81.21	0.27	10.1%	66.06	27	79	75.96	142.02	130.5	0.53	95	40.0
UGANDA	58.14	0.17		27.88	34	86	25.35	53.23	59.65	0.37	88	210.0
ZAMBIA	92.37	0.77	8.4%	58.49	52	100	29.11	87.6	91.58	1.21	85	40.0
ZIMBABWE	157.28	1.27	2.8%	118.43	70	99	41.34	159.77	282.09	3.03	51	180.0

* Number of faults to number of DELs in major towns

OTHER TELECOMS SERVICES

	FACSIMILE (1988)					
	BUREAUFAX	TELEFAX	TOTAL	DATA TERMINALS	LEASED CIRCUITS	TELEX SUBSCRIBER LINES
BOTSWANA	2	120	122	63	289	740
GAMBIA					3	140
KENYA	4	203	207	2530	2840	2530
LESOTHO		120	120		30	290
MALAWI		150	150	37		592
NIGERIA						5983
SIERRA LEONE	6		6		325	310
SWAZILAND				40	50	350
TANZANIA		170	170	2	720	1380
UGANDA	125	140	265	65	380	890
ZAMBIA		111	111	141	30	2520
ZIMBABWE	10	380	390	890	820	2583

RADIO BROADCASTING

	NUMBER OF RECEIVERS (000s) 1987	RECEIVERS PER 100 PEOPLE (1987)	(1987) TRANSMITTERS MF	HF	VHF	TOTAL	OWNER-SHIP *	(1987) BROADCST SERVICES	DAILY HOURS	COVERAGE (%) POPULATION	AREA
BOTSWANA	150	13.27	1	1	8	10	G	1	17	70	80
GAMBIA	115	14.38	5		2	7	G/C	1	15	70	60
KENYA	2000	9.05	11	3	2	16	G	2	18	90	88
LESOTHO	110	6.75	1	4	1	6	G	1	19	65	55
MALAWI	1500	18.96	9	2		11	P	1	21	60	50
NIGERIA	16600	15.57	20	16	3	39	P	2	19	100	100
SIERRA LEONE	830	21.61	1	1		2	G	1	13	55	50
SWAZILAND	105	14.79	3		6	9	G/C	2	18	100	100
TANZANIA	400	1.68	7	9		16	G	3	18	70	57
UGANDA	1600	10.21	2	7	1	10	G	2	17	40	57
ZAMBIA	550	7.63	4	12	6	22	G	3	7	60	40
ZIMBABWE	750	8.30	10	3	70	83	P	4	19	96	88

* G=GOVT/C=COMMERCIAL/P=PUBLIC

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TELEVISION BROADCASTING

	NUMBER OF RECEIVERS (1000s) 1967	RECEIVERS PER 100 (1967)	(1967) TRANSMITTERS VHF	UHF	TOTAL	OWNER-SHIP *	(1967) CHANNELS	DAILY HOURS	(%) COVERAGE POPULATION	AREA	SYSTEM
BOTSWANA	8	0.71									PAL I
GAMBIA											
KENYA	125	0.57	5		5	G	1	6	45	10	PAL B, G
LESOTHO	1	0.06	3		3	G					PAL I
MALAWI	5	0.06									PAL B, G
NIGERIA	600	0.56	53	9	62	G	2	9	80	75	PAL B, G
SIERRA LEONE	33	0.86	2		2	G	1	6	20	40	PAL B, G
SWAZILAND	9	1.27	3	6	9	G	1	6	40	70	PAL B, G
TANZANIA	15	0.06	1	1	2	G	1	5			PAL B, G
UGANDA	105	0.67	7	2	9	G	1	5	13	12	PAL B, G
ZAMBIA	110	1.53	12		12	G	1	6	60	45	PAL B, G
ZIMBABWE	193	2.13	16		16	G/P	2	8	57	47	PAL B, G

* G=GOVT/C=COMMERCIAL/P=PUBLIC

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APPENDIX G: TELECOMMUNICATIONS ADMINISTRATIONS

TELECOMMUNICATIONS ADMINISTRATIONS			
COUNTRY	**ADMINISTRATION NAME AND ADDRESS**	**PERSONNEL**	**MONTHLY SUBSCRIBER ACCESS FEE**
BOTSWANA	Botswana Telecommunications Corporation (BTC) P.O. Box 700 Gaborone, Botswana	1,053	US$3.00
GAMBIA	Gambia Telecommunications Co. Ltd. (GAMTEL) GAMTEL House Cameroun Street Banjul, The Gambia	430	US$4.00
KENYA	Kenya Posts and Telecommunications Corporation P.O. Box 30301, Nairobi Telephone: 254 2 27 401 Telex: 22245 DIRPOST	12,170	
LESOTHO	Lesotho Telecommunications Corporation (LTC) Thetsane Industrial Site P.O. Box 1037 Maseru 100, Lesotho	630	
MALAWI	Malawi Post Office Posts and Telecommunications Department P.O. Box 537 Blantyre, Malawi	1,553	US$3.00
NIGERIA	Ministry of Communications; Nigeria Telecommunications Limited (NITEL)	17,399	US$4.00
SIERRA LEONE	Sierra Leone National Telecommunication Company (SLNTC) Sierra Leone External Telecommunications Ltd.	865	US$21.00
SWAZILAND	Posts and Telecommunications Corporation Phuthfamani Building Warner St. P.O. Box 125 Mbabane, Swaziland	470	US$3.00
TANZANIA	Tanzania Posts and Telecommunications Corporation (TPTC) P.O. Box 9070 Dar es Salaam, Tanzania	4,910	US$4.00
UGANDA	Uganda Posts and Telecommunications Corporation (UPTC) P.O. Box 7171 Kampala, Uganda Telephone: 256 41 230 540 Telex: 61027 POSTEL UG Fax: 256 41 245 807	2,084	US$21.00

ZAMBIA	Posts and Telecommunications Corporation Ltd. P.O. Box 71660 Ndola, Zambia	3,410	US$2.00
ZIMBABWE	Posts and Telecommunications Corp. (PTC) P.O. Box 8061 Causeway Harare, Zimbabwe	5,210	US$3.00

APPENDIX H: BROADCAST ADMINISTRATIONS

BROADCASTING ORGANISATIONS[1]			
COUNTRY	**ORGANISATION**	**INVESTMENT (M US$)**	**PERSONNEL**
BOTSWANA	**Radio Botswana** Private Bag 0060 Gaborone, Botswana Telex: 2408 RB INF BD/2394 RB ENG BD Telephone: 352541 (Switchboard) 352861 (Director)	7.03	182
GAMBIA	Radio Gambia Mile 7, Banjul, The Gambia Cables: Broadcast Banjul Telex: 2204 PRESOF GV Telephone: 93-2101	0.07	
KENYA	Voice of Kenya (VOK) P.O. Box 30456, Nairobi Kenya Cables: Broadcasts Nairobi Telex: 25361 KBC KE Telephone: 334567 Fax: 332797		1,481
LESOTHO	Lesotho National Broadcasting Service (LNBS) P.O. Box 552, Maseru 100, Lesotho Cables: Media Maseru Telex: 4340 CLO Telephone: 323561 Fax: 310003		126
MALAWI	Malawi Broadcasting Corporation P.O. Box 30133, ChiChiri Blantyre 3, Malawi Cables: Radomalawi Blantyre Telex: 44425 WAILESI MI Telephone: 671222	1.53	331
NIGERIA	Federal Radio Corp. of Nigeria (FRCN) Broadcasting House, PMB 12504, Ikoyi, Lagos, Nigeria Cables: Broadcasts Lagos Telex: 21484 and 21011 FRCN NG Telephone: 603010 (5 lines)	30.44	2,780
	Nigeria Television Authority (NTA) Television House, Ahmadu Bello Way Victoria Island, PMB 12036, Lagos, Nigeria Cables: Nivision Telex: 22536 NTA HQ Telephone: 614966, 614916, 612529, 615154, 615949		6,920

[1] Source: Commonwealth Broadcasting Association, Who's Who, 1989

SIERRA LEONE	Sierra Leone Broadcasting Services (SLBS) New England, Freetown, Sierra Leone Cables: Broadcasts Freetown Telex: 3334 RADTEX SL Telephone: 40123		574
SWAZILAND	Swaziland Broadcasting Service P.O. Box 338, Mbabane, Swaziland Cables: Broadcast Mbabane Telex: 2035 WD Telephone: (09268) 42761-5, 42771-2	0.09	198
	Swaziland Television Broadcasting Corporation P.O. Box A146, Mbabane, Swaziland Telex: 2138 WD Telephone: 43036/7 Fax: 42093		
TANZANIA	Radio Tanzania - Dar es Salaam P.O. Box 9191, Dar es Salaam, Tanzania Cables: Sauti Dar es Salaam Telex: 41201 SAUTI (Director's Office) 41085 SAUTI (Newsroom) Telephone: 38011-6, 38077-8		795
UGANDA	Radio Uganda/Uganda Television Ministry of Information and Broadcasting, P.O. Box 7142, Kampala, Uganda Cables: Knowledge Kampala Telex: KNOLLEDGE 61094 UG Telephone: 254461 Directorate of Television Uganda Television P.O. Box 4260, Kampala, Uganda Cables: Uteevee Kampala Telex: 61188 UNA or 61084 KNOLLEDGE Telephone: 254461, 254468 or 245376	0.15	467/145

ZAMBIA	Zambia National Broadcasting Corp. P.O. Box 50015, Lusaka, Zambia Cables: Broadcasting Ridgeway Telex: ZA 41221 Telephone: 229648 Copperbelt Region Zambia National Broadcasting Corporation P.O. Box 20784, Kitwe, Zambia Cables: Broadcasting Kitwe Telephone: 213555 Educational Broadcasting Services P.O. Box 50231, Lusaka, Zambia Telephone: 251724 Educational Radio Service P.O. Box 50231, Lusaka, Zambia Educational Television Service P.O. Box 21106, Kitwe, Zambia Educational Audio-Visual Aids Service P.O. Box 5025, Lusaka, Zambia	1.64	146
ZIMBABWE	Zimbabwe Broadcasting Corp. Harare Headquarters P.O. Box HG 444, Highlands, Harare, Zimbabwe Cables: Broadcasts Telex: 24223 ZBCHOR ZW 24175 ZBCHOV ZW Telephone: 707222 and 729661/2 Bulawayo P.O. Box 2279, Bulawayo, Zimbabwe Cables: Broadcasts Bulawayo Telex: 33345 BULRAD ZW Telephone: 71811	0.57	820